

PROGRAMME GUIDE

DISTANCE EDUCATION PROGRAMMES

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY (MSCIT)

- **Scheme of Examination**
- **Detailed Syllabus**



DR. C.V.RAMAN UNIVERSITY
INSTITUTE OF OPEN AND DISTANCE EDUCATION (IODE)

KARGI ROAD, KOTA, BILASPUR, CHATTISGARH

PHONE : 07753-253737, 8827920016, 8827920019 FAX : 07753-253728

E-mail: iode@cvru.ac.in Website: www.cvru.ac.in

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY (MSCIT))

Duration : 24 Months Eligibility : Graduate in any Subject

New Proposed Scheme of Examination

Course Code	Name of the Course	Credit	Total Marks	Theory		Practical Marks		Assignments	
				Max	Min	Max	Min	Max	Min
FIRST SEMESTER									
1MSCIT1	Fundamentals of Computers & Information Technology	3	100	70	25	-	-	30	11
1MSCIT2	Windows & MS Office	3	150	70	25	50	18	30	11
1MSCIT3	Programming Methodology & Programming in C	3	150	70	25	50	18	30	11
1MSCIT4	Computer Networks & Internet	3	100	70	25	-	-	30	11
1MSCIT5*	Digital Electronics & Logic Design	2	100	70	25	-	-	30	11
Total		14	600	350	140	100	40	150	60
SECOND SEMESTER									
2MSCIT1	Objects Oriented Programming with C++	3	150	70	25	50	18	30	11
2MSCIT2	DBMS & SQL (With MS Access / MS SQL Server)	3	150	70	25	50	18	30	11
2MSCIT3	A. Computerised Accounting with Tally	3	150	70	25	50	18	30	11
2MSCIT4	Programming with VB.Net	3	150	70	25	50	18	30	11
2MSCIT5**	Data Structure with C++	2	150	70	25	50	18	30	11
2MSCIT6	Minor Project	4	100	70	25	-	-	30	11
Total		18	850	420	168	250	100	180	72
THIRD SEMESTER									
3MSCIT1	Operating Systems	3	100	70	25	-	-	30	11
3MSCIT2	Java Programming	3	150	70	25	50	18	30	11
3MSCIT3	Software Engineering	3	100	70	25	-	-	30	11
3MSCIT4	A. Computer Architecture	3	100	70	25	-	-	30	11
3MSCIT5	C. Artificial Intelligence And Expert System	3	100	70	25	-	-	30	11
Total		15	550/600	350	140	50/100	20/40	150	60
FOURTH SEMESTER									
4MSCIT1	Computer Graphics	3	100	70	25	-	-	30	11
4MSCIT2	Data warehousing & Mining	3	100	70	25	-	-	30	11
4MSCIT3	A. Advanced Java Programming	3	150	70	25	50	18	30	11
4MSCIT4	A. Discrete Mathematics	3	100	70	25	-	-	30	11
4MSCIT5	Major Project	6	200	-	-	150	54	-	-
Total		18	650/700	280	112	200/250	80/100	120	48

* This Paper shall be offered in the Third Semester of MSC(IT) Lateral Entry Candidates from PGDCA stream.

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Evaluation Scheme

1. 36% in each theory, practical, project, dissertation & internal assessment
2. 40% Aggregate marks to pass

1MSCIT1-FUNDAMENTALS OF COMPUTERS & INFORMATION TECHNOLOGY

Know the Computer -, Introduction, What does computer stand for?, Strengths of computers, Limitations of computers, Fundamental uses of computers, Development of computers, Types of Computers, Generations of Computers

Personal Computer - Introduction, Personal computer, Uses of personal computers, Components of personal computers, Evolution of PCs, Developments of processors, Architecture of Pentium IV, Configuration of PC

Boolean Algebra and Logic Gates - Introduction, Boolean Algebra, Binary Valued Quantities, And Operator, OR Operator, NOT Operator, Basic Postulates of Boolean Algebra, Theorems of Boolean Algebra, De Morgan's Theorems, Reducing Boolean Expression by their Simplifications, Proving the Equations of Boolean Expressions By Truth Table, Principle of Duality, Standard Forms, Basic Logic Gates, Use of Logic Gates in Circuits, Karnaugh Maps

Number System - Introduction, Digital and Analog Operations, Binary Data, Binary Number System, Decimal Number System, Octal Number System, Hexadecimal Number System, Fractional Conversion, Coding System

Data Representation and Binary Arithmetic - Introduction, Bits, Nibbles, Bytes and Words, Data Representation, Coding system, Binary Arithmetic, Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division, Character Representation, Checking the Result of Binary Arithmetic

Input Devices - Introduction, Input Device, Typing Input Devices, Pointing Input Devices, Scanning Input Devices, Audio Visual Input Devices

Output Devices - Introduction, Output Devices, Soft Copy Vs Hard Copy Output, Monitor, Printers, Plotter , Electrostatic Technique, Special Purpose Output Equipments

Central Processing Unit - Introduction, What is Central Processing Unit, Arithmetic And Logic Unit, Control Unit, Registers, Instruction set, Processor Speed

Storage Devices - Introduction, Storage and its needs, Brain Vs Memory, Storage Evaluation Units, Data Access Methods, Primary Storage, Secondary Storage, Hard Disk Operations, Floppy Disk Drives, Winchester Disk, Optical Disk, VCD, CD-R, CD-RW, DVD, Zip Drive, Flash Drives, Blue Ray Disk, Memory Card, Driving Naming Conventions In a PC

Basics of Software- Introduction, What Does Software Stand For ?, Needs of software, Types of software, Open Source Software, Integrated Development Environment

Operating System - Introduction, Operating System, Why an Operating System, Functions of Operating System, The Booting Process, Types of Reboot, Booting From Different Operating System, Types of Operating System, Some Prominent Operating Systems

Disk Operating System - Introduction, What is DOS?, Functions of DOS, Versions of DOS, DOS Commands , Important Internal Commands of DOS, Important External Commands of dos, Executable Vs Non-Executable Files In Dos

Programming Languages , Introduction, Data, information And Knowledge, Characteristics of Information, Comparison between human language and , Computer Language, What is a

program?, What is a Programming language?, Programming development cycle, Algorithm, Program Flowcharts, Pseudo code, Programming approaches, Programming Paradigms, Types of Programming Language, Third Generation Language, Fourth Generation Language

Computer Virus - Introduction, Virus, History, Mechanism of virus, How A Virus Spreads , How is virus named, A few Prominent Viruses, Types of Computer Virus, Related Concepts :, Anti Virus Programs, Norton Anti - Virus (NAV), Execution of Norton Anti-Virus

Communication and IT - Introduction, Computer Network, Communication Process, Communication Types, Transmission Media, Wireless Media, Communication Channels/Media, Modem, Characteristics of a Modem, Types of Modem

Networks - Introduction, Internet Vs Intranet, Types of Network, Topology, Types of Connectivity, Network Devices

Internet - Introduction, What is Internet actually ?, Growth of Internet, Owner of the Internet, Internet Service Provider, Anatomy of Internet, ARPANET and Internet history of the World Wide Web, Services Available on Internet (Internet Tools), Basic internet terminologies, net etiquette, Application of internet

Management Information System - Introduction, Information System, Management Information System (MIS), Fields of Information System, Elements Of MIS, Objectives Of MIS, Characteristics of MIS, Impact Of MIS, Designing An MIS, Placement Of MIS, Views Of MIS, Pitfalls In Designing an MIS, Advantages of MIS, Disadvantages of MIS

Applications of Computers and Information Technology - Introduction, Business And Computer, E-Mail, E-Commerce, Project management, Computers in Personnel Administration, Accounting, Computers in Cost and Budget Control, Marketing, Manufacturing, Materials management, Banking, Insurance And Stock broking, Purchasing, Computers in warehousing

1MSCIT2-WINDOWS & MS OFFICE

Know the Windows XP , Introduction, What is Windows XP ?, Evolution of Windows Operating System, Features of Windows XP, What's New in Windows XP, Windows and Its Elements.

Accessories And Other Tools , Introduction, The Calculator , Using THE Calculator, The Character Map, Using Outlook Express, The Address Book, The Paint, The Notepad, The WordPad, The NetMeeting, The Internet Explorer, The Windows Media Player, The MS-DOS , The Control Panel , The Windows Picture and Fax Viewer, The HyperTerminal, The Windows Messenger, Using Windows Movie Maker.

Managing Files and Folders , Introduction, Viewing files and folders, Arranging files and folders, Creating a new folder, Creating a file using short-cut.

Customizing Your Computer , Introduction, customizing Your Desktop, Changing the Start menu style, Setting a screen saver, Reversing your mouse buttons, Changing the appearance of your mouse pointer, Adding a new font to your computer, Logging off from the computer, Adding or Removing Programs, Hiding and displaying quick launch bar.

Microsoft Office XP Suite With Other Office Suites , Introduction, Different office suites, Microsoft Office XP Suite, What's Special About Office XP, Voice Dictation and Voice Commands, Smart Tags , The Office Task Panes , The Ask a Question Box, Document Recovery, Product Activation.

Common Elements Of The Suite , Introduction, Different Integrated Items in Office Suite, Menu Bars and Toolbars, Shared Tools, ObjectS, Linking, Embedding, Office Assistant and Online Help.

Office Task Panes , Introduction, The Task Pane, Displaying And Hiding a Task Pane, Types of Taskpane, Additional Task Panes, Insert ClipArt Task Pane, Styles and Formatting Task Pane, Mail Merge Task Pane, Exercise.

Word Processing and MS-Word , Introduction, Features of Word Processor, MS-WORD—a powerful word processor, Starting MS-Word, Chief Elements Of MS-Word Window, Displaying and Hiding the Toolbar, File operations in MS-WORD, Using Help Online, Customizing Office Assistant.

Text Formatting , Introduction, Typing the text, Selecting Text with a mouse, Deleting Text, Restoring the deleted text, Typing over the existing text, Undoing/Cancelling the last action, Redoing/Repeating the last action, Formatting font, Advanced text formatting, Customizing Spelling Check, Using the thesaurus.

Document Formatting , Introduction , Using page border, Bullets and numbering, Setting and removing tab stops, Making word count, Using Autotext, Using autocorrect, Headers and Footers, Setting up columns in the document, Removing columns from the document, Inserting page numbering, Formatting the page numbering, manual and automatic page breaks, Setting margins, Inserting date and time, Using Goto, Cursor movement with key-board.

Tables And Graphics , Introduction, creating tables, calculating numeric data in a table , Deleting columns and rows, Formatting a table, Aligning text in the table, Formatting text in the table, Applying borders and shadings, Add a border to a table, Automatically format a table , Using Drawing, Creating a Shape, Using Word Art, Using Autoshapes, Insert a clip from the Clip Organizer, Inserting a text box, What is Drawing Canvas?, Using autoshapes.

Mail Merge, Views, Template and Wizard , Introduction, Mail merge , Views, Overview of templates, Creating a document template, Create a Web page based on a template, Modify a document template, RULER, ZOOM, PROTECTING YOUR DOCUMENT, INSERTING A FILE INTO ANOTHER , overview of wizard , Inserting Hyperlinks to a Web Page or a Word Document , EXERCISE.

Spreadsheet and MS-Excel , Introduction , Starting MS-Excel , Spreadsheet and its Elements , Application Window , Document Window, Cell , Standard Toolbar, Formatting Toolbar, Workbook , Worksheet, Handling Files.

Worksheet Formatting , Introduction, Entering Text Data, Entering Formula , Editing the Cell Content, Formatting the Cell , Formatting Font, Setting Border Around Cell, Highlighting gridlines, Using Format Painter, Finding and Replacing the Text, Using Spelling and Grammar.

Function and Operator , Introduction, Entering Functions , Editing Functions, Using Mathematical Functions, Using Statistical Functions, Using Date & Time Functions, Changing the default date format , Text Function, Logical Functions, Financial Function, Operators, AutoSum, Function Wizard.

Chart and Web Object , Introduction, Types of Charts, Creating a Quick Chart Sheet , Parts of a Chart, Types of Charts, Creating A Chart using wizard, Using Pivot Table , Object Linking and Embedding (OLE), Linking Cells, Linking Formula, Hyper Links, Previewing charts, printing charts, Exercise.

Presentation Package And MS-PowerPoint , Introduction, Chief Elements of Presentation, Starting Powerpoint, Creating A Presentation, Creating A Presentation with Auto Content Wizard, Create a presentation using a design template, Creating a blank presentation, Powerpoint window and its Elements, Using Help Online, Customizing Office Assistant .

Text Formatting in Slides , Introduction , Adding text to slides, Editing text on a slide, Using Format Painter, Setting Paragraph Indents, Line Spacing in a Paragraph, Setting and Removing Tab Stops , Checking Spelling of the text , Finding and replacing the text, Moving slides.

Table, Chart and other Drawing Objects, Introduction, Creating a table, Creating an embedded Word table, Adding Columns and Rows, Deleting Columns and Rows, Changing Table Borders, Using Autoshapes, Chart, Inserting a clip to your slide, Using Word Art, Inserting A Word Art, Working With Drawing Toolbar, Creating A Shape.

, **Slides, Views, Notes, Handouts** , Introduction, PowerPoint Views, Notes Pages, Using Handouts, Inserting Header and Footer in the, Slide , Transition , Custom Show, Assigning Custom Animation , Adding a motion path, Animating a chart, Publish a presentation or HTML file , to the Web, Preview a presentation as a Web page, Showing Slides , Printing Slides .

Outlook Express , introduction, WHAT IS outlook express?, Features of Outlook Express, starting outlook express, Concepts of CC and BCC, Email address, Reading a received message , composing message, Replying And Forwarding Messages, attaching files, Creating signature in outlook express, Formatting message text, What is mime?, applying stationery, Inserting a hyperlink or HTML page into a message, Flagging an e-mail or news message, Importing messages from other e-mail programs, What are newsgroups?, Adding a newsgroup account, Switching between e-mail and news reading, Identities (Multiple Users on A Single Computer), Adding a new identity, Managing contacts with outlook, creating addresses, Importing an address book from another program, Using keyboard shortcuts in Outlook Express ,

1MSCIT3-PROGRAMMING METHODOLOGY & PROGRAMMING IN C

Principles of Programming, Introduction to Programming, Program Concept, Characteristics of Programming, Stages in Program Development, Tips for Program Designing, Programming Aids, Algorithms, Notations, Design, Flowcharts, Symbols, Rules

Programming Techniques and Logic, Introduction, Introduction to programming techniques, Top-down approach or technique, Bottom-up approach or technique, Unstructured technique of programming, Structured technique of programming, Modular technique of programming, Comparative study of programming techniques, Cohesion , Coupling, Debugging , Syntax Errors, Logical Errors, Data Entry Errors, Linker Errors, Runtime Errors, Program Testing

Turbo C IDE, Turbo C IDE (Integrated Development Environment), Main Menu Bar, File Options, Edit option, Run option, Compile option, Project option, Options option, Debug option, Break/watch option, Edit Window, Message Window, Status bar, Editing, Compiling and Running a C Program, Features of C language, C language standards, Standardization , Successors of C language

Introduction to 'C', Introduction, Structure of a C program, 'C' Tokens, Keywords, Identifiers, 'C' Constants, Variables in C, Data Types, Derived Data Types : , Operators, Precedence and Associativity of operators, Hierarchy of operators at a glance, Expression & its Evolution, Type conversion in expressions , (Implicit and Explicit type conversion)

Decision Making and Branching, Introduction, Sequential statements, Unformatted I/O functions, Formatted input using scanf() function, Formatted output using print(), Branching statements, The if-else statement, The nested if-statement, The switch statement, Additional programs

Looping Statements, Introduction, for-statement, while-statement, do-while statement, Difference between while-loop and do-while loop, Nested loops, Jumps in loops, Programming examples

Arrays, Introduction, Single-dimensional arrays, Reading and writing single dimensional arrays, Examples of Complex Programs, Searching, Sorting, Two-dimensional arrays (Multi-dimensional arrays), Reading-writing two-dimensional arrays, Manipulation in two-dimensional arrays, Programming Examples

Strings, Concepts of string, Strings in C language, String variable, Initializing strings, String input/output functions, Arrays of strings, String handling functions, Memory formatting

User Defined Functions, Introduction, Elements of user-defined functions, Categories of functions, Passing parameters to functions, Programming Examples, Arrays in functions, Nesting of Functions, Recursion, Command Line Arguments , Storage Classes

Structure and Union, Introduction to structures, Structure and its definition, Structure declaration, Tagged Structure, Structure variables, Type-Defined Structure, Structure initialization, Accessing structures, Nested structures, Array of structures, Structures and functions, Sending individual members, Sending the whole structure, Passing structures through pointers, Uses of structures, Union and its definition

Debugging, Common Programming Errors, Program Testing and Debugging, Types of Errors, Debugging C program

Pointers, Introduction, Pointer concepts, Pointer variable, Accessing variables through pointers, Pointer declaration and Definition, Initializing a pointer variable, Pointers to Pointers, Compatibility, Pointer applications, Pointers and other operators, Memory allocation functions, Memory map of C program, Memory management functions

File Handling, Introduction to file handling, File system basics, Standard streams in C, File structure, FILE pointer, Opening and closing a file, File handling functions, File types, Text and Binary, Input / Output operations on file, Reading a character using `getc()`, Writing a character using `putc()`, Using `feof()`, Working with string using `fputs()` and `fgets()`, Using `fprintf()` and `fscanf()`, Using `fread()` and `fwrite()`, Direct Access file, `fseek()`

1MSCIT4-COMPUTER NETWORKS & INTERNET

INTRODUCTION TO COMPUTER NETWORK, Network, Computer Networks, Need of Network, Uses of Computer Network, Applications of networks, Network Criteria, Network Hardware and Software, network types : client, server & peers, Classification of Computer Network, Server, ATM (Asynchronous Transfer Mode), Modem

THE THEORETICAL NETWORK MODEL - OSI, OSI Model, open system interconnection model (OSI), Layered Architecture of the OSI Reference Model, Functions of the ISO/OSI Layers, Summary of OSI Layer functions

TRANSMISSION TECHNOLOGY, transmission technology, Data can be analog or digital, Analog and Digital Transmission, asynchronous & synchronous transmission, Types of Communication Modes, BaseBand and Broadband Transmission, Comparison of Baseband and Broadband Signaling

NETWORK TOPOLOGY, Network Topology, Types of Network, Local Area Network (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Satellite Networks, Wireless LAN

TRANSMISSION MEDIA, Transmission Media, Classification of Transmission Media, Comparison of Guided and Unguided Media, Twisted Pair (TP) Cable, Coaxial Cable, Fiber Optic Cable (FOC), Unguided Media, Radio Frequency Characteristics, Microwave Transmission, Applications of Infrared Transmission, Switching Methods, Packet switching, Circuit Switching, Message Switching

DATA LINK LAYER, Data Link Layer Design issues, Sliding Window Protocols

NETWORK ADAPTERS, Multiple Access Protocol, ALOHA, Carrier Sense Multiple Access (CSMA), CSMA/CD [Carrier Sense Multiple Access/Collision Detection], Collision Free Protocols, Limited Contention Protocol

NETWORK LAYER, Functions of Network Layer, Routing Algorithms, Congestion Control Algorithm

APPLICATION LAYER, Domain Name System, Simple Mail Transfer Protocol (SMTP), Hyper Text Transfer Protocol (HTTP), File Transfer Protocol

CRYPTOGRAPHY, Encryption & Decryption - Cryptography, Terminology, Classification of Cryptography :, Substitution Ciphers :, Security of algorithms :, Steganography :, Steganography vs Cryptography :, public key encryption, Comparison of Symmetric and Asymmetric Key Cryptography, Public Key Cryptanalysis, Digital Signature, Requirements of Digital Signature, Direct Digital Signature, Arbitrated Digital Signature,

Authentication Protocols, Symmetric Encryption Approach, Public-Key Encryption Approach, Digital Signature Standard, RSA and Digital Signature, DSS Approach, The Digital Signature Algorithm

1MSCIT5*-DIGITAL ELECTRONICS & LOGIC DESIGN

Digital Number System - Data Type, Number System, Decimal Number System, Binary Number System, Octal Number System, Hexadecimal Number System, Conversions, Decimal to Binary Number System, Decimal to Octal Number System, Decimal to Hexadecimal Number System, Binary-To-Decimal Conversion, Binary to Octal Number System, Binary to Hexadecimal Number System, Octal to Decimal Number System, Octal to Binary Number System, Octal to Hexadecimal Number System, Hexadecimal to Decimal Number System, Hexadecimal to Binary Number System, Hexadecimal to Octal Number System

Binary Arithmetic - Addition, Binary Number Addition, Octal Number Addition, Hexadecimal Number Addition, Subtraction, Binary Number Subtraction, Octal Number Subtraction, Hexadecimal Number Subtraction, Binary Multiplication, Binary Division, 1's Compliment, 2's Compliment, Subtraction Using 2's Compliment

Arithmetic Operations - Integer Data, 8 Bit Signed Binary Representation, 16 Bit Signed Binary Representation, Fixed Point Representation, Floating Point Representation, Binary Codes, Weighted Code (8421, 2421, 5211), Un Weighted Code, Excess 3 Code, Gray Code, Error Detection Code, Even Parity, Odd Parity, Error Detection and Correction Code, Alpha Numeric Code, EBCDIC

Boolean Algebra - Introduction, Boolean Postulates : , Boolean Identities :, OR Gate Identity, AND Gate Identity, NOT Gate Identity, Boolean Laws, Commutative Law, Associative Law, Distributive Law, Duality, DeMorgan's Theorem

Logic Gates - Logic Gates, NOT Gate, AND Gate, OR Gate, NAND Gate, NOR Gate, Ex OR Gate, Ex NOR Gate, Universal Gate

Karnaugh Map - Introduction, Karnaugh Map, MIN and MAX Terms, MIN and MAX Terms from Truth Table, Product of Sum (POS) Equation, Simplification of Boolean Equation by K Map, Two Variable K Map, Three Variable K Map, Four Variable K Map, Don't Care Condition

Combinational Circuits - Introduction, Arithmetic Circuits, Adders, Half Adder, Full Adder, Serial Adder, Parallel Adder, BCD Adder, Subtractors, Half Subtractor, Full Subtractor, Parity Generator - Checker, Three Bit Parity Generator, Three Bit Parity Checker, Binary Comparators, Two Bit Comparator, Multiplexers, 4-to-1 Multiplexer, 16-to-1 Multiplexer, De-multiplexer, 1-to-4 De-multiplexer, 1-to-16 De-multiplexer, Encoder, Decimal to BCD Encoder, Octal to Binary Encoder, Decoder

Sequential Circuits - Introduction, Clock, FLIP FLOP, Latch, S-R Flip Flop, J-K Flip Flop, Master Slave J-K Flip Flop, Preset and Clear Inputs, T(Toggle) Flip Flop, D(Delay) Flip Flop, State Diagrams of Flip-Flops, State Diagram of SR Flip-Flop, State Diagram of JK Flip-Flop, State Diagram of T Flip-Flop, State Diagram of D Flip-Flop, 8.5 Excitation Table of Flip-Flops, Excitation Table of SR Flip—Flop, Excitation Table of JK Flip-Flop, Excitation Table of D-Flip-Flop, Excitation Table of T-Flip-Flop

Registers - Introduction, Bit Shift Register, Serial In Serial Out (SISO), Serial In Parallel Out (SIPO), Parallel In Serial Out (PISO), Parallel In Parallel Out (PIPO), 4 Bit Left Shift Register, 4 Bit Right Shift Register, Universal Shift Register, Applications of Registers, Ring Counter, Self Correcting Ring Counter, Johnson or Twisted Ring Counter

Counters - Introduction, 2-Bit Asynchronous Up Counter, 4-Bit Asynchronous Up Counter, 4-Bit Asynchronous Down Counter, Asynchronous Binary Up/Down Counter, Asynchronous Counter Design, 2-Bit Synchronous Counter, 3-Bit Synchronous Counter, 3-Bit Synchronous Down Counter, 3-Bit Synchronous Up/Down Counter, Design of Modulus N Synchronous

Counters, Skipping State Counter, State Reduction and State Assignment, Comparison Between Asynchronous Vs Synchronous Counters

Register Transfer Level (RTL) - Introduction, Micro-operations, Transfer Micro-operations, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Instruction Code and Code Format, Design of a Simple Computer, Components Of Digital Computer, Designing a Simple Computer, Steps to Design a Computer,

SECOND SEMESTER

2MSCIT1-OBJECTS ORIENTED PROGRAMMING WITH C++

Overview of C++ - Overview of C++, Software crisis, Object oriented programming paradigm, Basic concepts of OOP, Advantages/Benefits of OOP, Usage/applications of OOP

C++ Environment, Program development environment, The language and the C++ language standards, Introduction to various C++ compilers, The C++ standard library, Prototype of main() function, i/o operator, manipulator, comments, data types

Creating and Compiling C++ Programs - TURBO C++ IDE, Creating, compiling and running a C++ program using ide and through command line, Elements of C++ Language, Structure of a C++ program, C++ tokens, Type conversion in expressions

Decision Making and Branching - Introduction, Sequential statements, Mathematical Functions, Branching statements, looping Statements, Nested loops, Programming examples

Arrays and Functions- Arrays, The meaning of an array, Single-dimensional arrays, Two-dimensional arrays (Multi-dimensional arrays), User Defined Functions, Elements of user-defined functions, Return values and their types, Function calls, Categories of functions, Passing parameters to functions, Recursion, Command Line Arguments, Storage Class Specifiers

Classes and Objects - Classes, Structures and classes, Unions and classes, Friend function, Friend classes, Inline function, Scope resolution operator, Static class members, Static data members, Static member functions, Passing object to functions, Returning objects, Object assignment

Array, Pointers, References and the Dynamic Allocation Operators - Array of objects, Pointer to object, Type checking in C++, The this pointer, Pointer to Derived Types, Pointer to class members, References, C++'s Dynamic Allocation Operators

Constructors and Destructors - Introduction, Constructors, Default Constructor, Parameterized constructors, Copy Constructors, Multiple Constructors in a class, Constructors with default arguments, Default Arguments, Special Characteristics of Constructor functions, Destructors

Function and Operator Overloading - Function overloading, Overloading Constructor Function, Finding the address of an overloaded function, Operator Overloading, Creating a Member Operator Function, Creating Prefix and Postfix forms of the increment (++) and decrement (--) operators (Overloading Unary Operator), Overloading the Shorthand Operators (i.e. +=, -= etc), Operator Overloading Restriction (Rules), Operator Overloading using friend function, Overloading new and delete operator, Overloading some special operators, Overloading [] (Subscripting) operator, Overloading() (Function Call) operator, Overloading Binary Arithmetic operators, Concatenating String, Overloading Comma (,) operator, Overloading the I/O operators

Inheritance - Introduction to inheritance, Features or Advantages of Inheritance, Type of Inheritance :, Base Classes and Derived Classes, Base Class Access Control, Protected Members, Protected Base class Inheritance, Inheriting Multiple Base Classes, Constructors, Destructors and Inheritance, Passing Parameters to Base Class Constructors, Granting Access, Virtual Base Classes

Polymorphism - Polymorphism, Types of Polymorphism, Virtual Functions and Polymorphism, Pure Virtual Functions, Early Vs Late Binding

The C++ I/O System Basics - The C++ I/O System basics, C++ predefined streams, Formatting using the ios members, Clearing Format Flags, An Overloaded form of setf(), Examining the Formatted Flags, Using width(), Using precision(), Using fill(), Using Manipulators to format I/O, Creating your own Manipulators,

2MSCIT2-DBMS & SQL (WITH MS ACCESS / MS SQL SERVER/ ORACLE)

Introduction to DBMS & RDBMS - Introduction to database, Introduction DBMS, Different database models, Structure of DBMS, RDBMS an introduction, Cod's law for RDBMS, Components of rdbms (kernel/data dictionary)

Introduction to Oracle RDBMS and Client/Server Computing - Introduction to Oracle, The Features of Oracle 9i, The oracle product details, An introduction to client/server computing, Oracle and client/server computing

Overview of Oracle Architecture - Oracle Architecture, Oracle Files, System and User Processes, Oracle Memory, System Database Object, Protecting Data

Introduction to SQL*PLUS -Introduction to SQL, Features of SQL, Components of SQL, Introduction to SQL*PLUS, Features of SQL*PLUS, Execution of SQL*PLUS, Important commands used in SQL*PLUS, Oracle Data-Types

Working with Tables -Tables - An Introduction, Use Of Table In SQL, Viewing The Stored Data In Tables, Filtering Table Data, Updating Data, Deleting Data From Tables, Modifying The Structure Of Tables, Destroying A Table, A Few Other SQL Statements

Data Constraints - Data Constraints, The Use of Data Constraints, The Types of Data Constraints, Defining Integrity Constraints By 'Alter Table', Removing Integrity Constraints, 'Null' Value Concept, 'Not Null' Constraint, Default Value Concept, 'User Constraints' Table

Data Manipulation in SQL - Oracle Operators, Range Searching, Pattern Matching, LIKE 'IN' and 'NOT IN' Predicates, An Introduction to 'DUAL' Table, An Introduction to 'SYSDATE'

Oracle Functions - Oracle Function, Function Types, Group Function, Scalar Function, Working With 'Date' in SQL, Grouping Of Data Of Different Tables In SQL

Joins, Sub-Queries & Views - types of joins, use of sub-query, 'union' and clause, 'Intersect' Clause, Minus Clause, Concept of View, Types of View, Use of View

User Accounts Management & Indexing - Creation of User Account, User Account Management, Granting Privileges, Revoking Privileges, Modifying Password, Closing User Account, Concept of Index, Creation of Index, Types of Index, Use of Index, Deleting Index

Introduction to PL/SQL Programming - Introduction to PL/SQL, Advantages of PL/SQL, Differences between SQL and PL/SQL, PL/SQL Block Structure, PL/SQL Character set, Variable, Constant and Data type, Assignment Operator and the use of 'SELECT...INTO', PL/SQL Program Control Structure, The use of 'IF...THEN...ELSE...ENDIF', Iteration Control (The use of LOOP, WHILE, FOR), The use of 'GOTO Statement

Cursor - Cursor an Introduction, Types of Cursor, Features of Cursor, Implicit Cursor, Explicit Cursor, Application of for Loop with Cursor

Exception Handling in PL/SQL - Exception Handling in PL/SQL, Built in Exception Handling, User Defined Exception Handling, The Raise Application-error Procedure

Oracle Transaction - Oracle Transaction, Commit Statement, Rollback Statement, Save point statement, Concept of lock, Types of locks, Levels of Locks, 'SELECT.....FOR UPDATE' Statement, Removing the Lock

Procedures and Functions- Concept of Procedures and Functions, Advantages of Procedure and Function, Creation of Procedure and Function, Deleting Procedure and Function

Database Triggers - Concept of Triggers, Types of Triggers, Creation of Triggers, Application of Triggers, Deleting Triggers

2MSCIT3-A. COMPUTERISED ACCOUNTING WITH TALLY

Accounting, Meaning Of Accounting, Objectives Of Accounting, Important Terms, Accounting Equation, Rules Of Debit And Credit- Journal & Ledger, Journal, Ledger, Cash Book, Subsidiary Books, Financial Statement, Trading & P&L A/C, Balance-sheet, Inventory, Adjustment Entries, Bill Of Exchange

Installing Tally 9, Introduction, Tally 9.0 (Release 1.0), Major Enhancements In Tally 9, Minor Enhancements In Tally 9, Multilingual Business Accounting And Inventory Management Features, Performance And Implementation Features, Accounting And Inventory Control Features, Installing Tally 9.0, Application Directory, Data Directory, Configuration Directory, Language Directory, Activating Tally, Activating Tally Gold For Multi User, Registering Tally, Validating Tally, Tally Data Migration Tool, Uninstalling Tally 9

ABC of Company, Creation Of New Company Selection Of New Company Deletion Of Company Alteration Of Company Shut A Company

Company Features, Features Of Company Accounting Features Inventory Features, , Statutory Features

Tally Screen Components, Title Bar, Button Bar, Calculator, Working Area, Quitting, Gateway Of Tally, Current Status Area

Configuration, General, Numeric Symbols, Accts/Inventory Info, Printing, Connectivity, Licensing, Shop, Quit

Budget, Introduction, Budget, Creating Budget, Alter A Budget, Delete Budget, Display Budget/ Budget Variance, Scenarios

Job Costing, Introduction, Enabling Or Configure Job Costing In Tally, Master Creation For Job Costing, Voucher Type And Voucher Class, Job Cost Reports

Reports, Introduction Accounting Reports, Trial Balance, Balance Sheet, Profit & Loss, Cash Flow Statement, Fund Flow Statement, Ratio Analysis, Day Book, Cash/Bank Book Sales Register Purchase Register Outstanding Interest Cost Centers Job Work Analysis Statistics Inventory Reports

Accounts Groups & Ledgers, Introduction Accounts Group Multiple Group Creation Display Group Alter Group Multiple Ledgers Display Ledger Alter Ledger Voucher Types

Payroll Accounting, Introduction, To Activate Payroll In Tally 9, Payroll Menu, Display Pay Heads, Multiple Group Creation, Employee Creation, Salary Detail, Attendance, Attendance Type, Voucher Creation

Export & Import, Introduction, Export, Import, ODBC Compliances

Cost Centre, Introduction Cost Centre, Creating Cost Centre, Display Cost Centre, Alter Cost Centre Cost Category, Create Cost Categories, , Display Cost Categories, Alter Cost Categories Voucher Entry Cost Centre Class, Creating Cost Centre, Invoice Entry Using Cost Centre Reports Related To Cost Centre

Foreign Currencies, Introduction Foreign Currency, Create Foreign Currency, Alter Foreign Currency, Display Foreign Currency, Exchange Rate Entry Voucher Entry Using Foreign Currency Voucher Entry Through Forex Journal Voucher Class Reports Related To Foreign Currency

Interest, Introduction, Interest, Simple Mode, Interest On Outstanding Balances, Reports On Interest Calculated On Outstanding Balances, Advanced Parameter Mode, Interest Calculation Transaction By Transaction/Voucher Interest At Fixed Rate, Voucher Interest At Variable Rate, Statement Of Interest Due On Invoice, Interest Reports, Interest Voucher Class

Printing, Introduction Cheque Printing Printing Of Cheque Multi Account Printing Printing Options General, Purchase Printing, Sales Transaction, Receipt Voucher, Journal/Contra, Debit/Credit Note, Reminder Letter, Confirmation Statement Reports Printing Button Related

Bank Reconciliation, Introduction, Bank Reconciliation In Tally 9, Configuration Of Bank Reconciliation

Security Control, Introduction Security Levels Access Type

Backup & Restore, introduction, Group Company, Create a Group Company, Alter a Group Company, Tally Audit, Splitting Company Data

Inventory, Introduction Stock Group Stock Item Stock Categories Godowns Units Of Measures Rate Of Duty Inventory Vouchers Reorder Level Inventory Reports Inventory Info Inventory Books Statement Of Inventory Batch Wise Details Price List

2MSCIT4-PROGRAMMING WITH VB.NET

Introduction to .NET - Introduction, What is a Program?, What is Programming?, What do you mean by .NET Framework?, Features of .NET Framework, VB 6 VS VB.NET, VB.NET VS JAVA, VB.NET VS C#, What is .NET Architecture?, What is CLR?, What do you mean by Class Library?, Versions of .NET Framework, What are Assemblies?, Namespaces, CTS (Common Type System), Interfaces, What is special in VB.NET?

Visual Studio 2005 - Introduction, What is Visual Studio?, Flavors of Visual Studio, Visual Studio 2005, File Extensions Used in VB.Net, Using Visual Studio 2005, Feature of Visual Studio 2005, Output Window, Components Tray, References and the Reference Window, Quick View of Visual Studio 2005, Opening an existing project, Adding a Form to a Project

The Visual Basic Language - Visual Basic Statements, Data Types in VB.NET, Declaring Variables, Declaration of Variables (Advanced), Data Type Conversion, String Functions, Formatting Data, Arithmetic Operators, Parentheses and Precedence, Operator Operation, Constants, Control Statements, Arrays in VB.NET, Specifying Optional Procedure Arguments, Passing a Variable Number of Arguments, Recursion, Using a Delegate

Working With The Controls - The Toolbox, Adding and deleting Tools in the Toolbox, creating a tab on the toolbox, Form Designer Basics, The Button, The ComboBox, The ListBox, The Checkbox, The PictureBox, The RadioButtons, The Scroll Bar, Timer, ListView, TreeView, Toolbar, Dialog Boxes, Menus in VB.NET, LinkLabel Control

Designing Menus - Menus, Context menu, Event of the MenuItem, Creating menu items in Visual Studio .Net

Object Oriented Programming with VB.NET - OOPs?, What is an Object?, What are Classes?, Visual Basic .NET and Object-Oriented, Principles of Object-Oriented Programming, Classes V/s Objects, Inheritance, Polymorphism and Overloading, Scope and Accessibility in Class Modules, Namespaces, Managed Execution, Assemblies, Assemblies in VB .NET

The .NET Framework Class Library - The .NET Framework Class Library, The System Namespace, Data Type Conversion Using Convert Class, The Array Class, The Math Class, The String Class, Other Namespaces, System.Collections, System.Data, System.IO

OLE/COM/Win32 API - Object Linking and Embedding, History of OLE/COM, Component Object Model (COM), COM interoperability in .NET, Win32 API in .NET, COM Interoperability in .NET, Installation and Registration of Assembly, Microsoft Office solutions with Visual Studio

.NET, Automation of Office from Visual Studio .NET, Creating and opening Microsoft Word document from VB.NET

User Controls in VB.NET - Introduction, The Control Class, The Control Class' Properties, The Control Class' Methods, Creating the Control Project 1, The RoundButton Control, Creating the Control Project 2, Building the new Button

A Brief Introduction to Database Access with VB .NET - Introduction, What is ADO?, What is ADO.NET?, The Connection Object, Connecting to a Database, The Command Object, The DataAdapter Object, The DataReader Object, The DataSet Object, Updating Your Database by Using DataSets, The AcceptChanges () Method, The RejectChanges () Method, The HasChanges () Method, The GetChanges () Method, Working with DataSets in Visual Studio, Moving Around in DataSet and Retrieving Data, Using Strongly Typed DataSets, DataSets With Multiple Tables, Finding and Sorting Data in DataSets, Filtering on Row State and Version, Data View Manager

Graphics In VB.NET - Introduction, Service of GDI+, Using GDI+ Manged Classes, BRUSH Class, Bitmap Class, Graphics Class, Simple Drawing, Drawing Text, An Example: Show All Fonts, Printing, Printing Multiple Pages, More on the PrintPageEventArgs Class, Using a Print Dialog Control, Rolling Your Own Printing Code, Print Preview

2MSCIT5**-DATA STRUCTURE WITH C++

Analysis of Algorithm-Introduction, Criteria of Algorithm, Time Complexity, Space Complexity, Asymptotic Notation :, Big Oh (O) Notation :, Big Omega (Ω) Notation :, Big Theta (Θ) Notation

Types of Data structures- Introduction, Types of Data structures, Linear Data Structures, Non Linear Data Structure, Array, SPARSE MATRICES, Garbage Collection, Benefits, Disadvantages

Stacks-Introduction, Push operation, Pop operation, Stack implementation using arrays, (static implementation of stacks), STACK as a Linked List, Stack as an abstract data structure, Applications of stack, Conversion of Expressions, Precedence and associativity of the operators, Evaluation of Postfix expression, Multiple stacks,

Recursion-Introduction, Working of recursion, Fibonacci series, Tower of Hanoi, Efficiency of recursion

Queue-Introduction, Different types of queues, Queue (Linear queue), Queue as an abstract data structure, Circular queue, Double ended queue (Deque), Priority queue, QUEUE as a Linked List, Applications of Queue

Linked Lists-Concept of list and array , Introduction to Data Structures, Arrays, Linked list, Singly or Linear linked list, Circular singly linked list, Doubly linked lists, Header Node, Applications of linked lists, Addition of two long positive numbers, Evaluation of a polynomial

Trees-Introduction, Representation of tree, Binary Tree , Representation of binary tree, Array representation of binary tree, Linked List representation of binary tree, Basic Operation on Binary Tree- Traversals, Binary Tree Traversal Algorithms (Recursive), Creation of Binary Search Tree:, Types of binary trees, Operations on Binary Search Tree (BST), Threaded binary trees, Application of Binary Tree:, B-Tree, Height Balanced Tree ,

Graph- Introduction to Graphs, Undirected Graph, Directed Graph or digraph, Graph Representation, Adjacency Matrix Representation, Adjacency List Representation, Graph Traversals, Breadth First Traversal, Depth First Traversal , Searching in Graph, Minimal Spanning Tree, Kruskal's Algorithm, Prim's Algorithm , Shortest Path in Graph,

Sorting and Searching - Introduction, Bubble sort, Selection Sort, Merge Sort, Quick sort, Insertion Sort, Shell sort, Address calculation sort, Radix sort, Comparison of sorting methods,

Hash Table, Collision Resolution Techniques, Linear Search (Sequential Search), Binary Search, Searching an ordered table, Indexed sequential search, Interpolation search

File Structure And Indexing- Introduction, Objectives, Terminology, File Organisation, Sequential Files, Disadvantages, Direct File Organisation, Indexed Sequential File Organisation

2MSCIT6-MINOR PROJECT

A two-three weeks project topic will be assigned to each of the student individually on the related topics studied in the First Semester on which student shall prepare a project report and submit to the University. Detailed Guidelines related to the Minor project can be obtained in the contact-class or can be downloaded from the website.

THIRD SEMESTER

3MSCIT1-OPERATING SYSTEMS

Operating Systems : Overview -Introduction of Operating System, Types of Operating System, System Components and it's services, System Calls, System Programs, Structure, Design and , Implementation, Operating System Generation

Process : Concept, Description and Control -Concept of process, Process state model, Process description - PCB, Process control, Threads, Threads in Linux

Process Scheduling - Types of Scheduler, Scheduling Criteria, Uniprocessor, Scheduling, Multiprocessor Scheduling, Algorithm Evaluation, Process Scheduling in Linux

Concurrency - Introduction to concurrency, Critical section problem, Mutual Exclusion solutions, S/w approach, H/w support, semaphore, monitor, Classical problem of synchronization

Deadlock - Deadlock Characterization, Deadlock Prevention, Deadlock Detection, Deadlock Avoidance, Combined Approach

Protection - Goal of Protection, Protection Domains, Access Matrix, Implementation of Access Matrix, Revocation of Access Rights, Language Based Protection

Security and Encryption - Security Problem, User Authentication, Program Threats, System Threats, Securing System and Facilities, Encryption & Decryption - Cryptography

Memory Management -Memory Management Requirements, Address Space, Linking and Loading, Swapping, Partitioning, Paging, Segmentation

Virtual Memory - Introduction to Virtual Memory, Demand Paging, Page Replacement, Thrashing, Demand Segmentation

Input Output Systems - Input - Output Devices, Hardware Support for I/o, I/O Communication Techniques, I/O Software Device Drivers, Performance Consideration,

Disk Structure - Introduction to Disks, Disk Scheduling, Disk Management, Disk Reliability, Swap Space Management, Stable Storage Implementation

File Management - File Concepts, Directory structure, File Sharing, Protection, File system in Linux

3MSCIT2-JAVA PROGRAMMING

OVERVIEW OF JAVA - Introduction, Programming paradigm, OOPS Concepts, Evolution of Java, Features of Java, C++ Vs Java, Java and Internet, Java and WWW, Java support systems, Java Environment

KEY FEATURES OF JAVA - Introduction, Java Program Structure, Simple Java Program, Tokens, Java Statements, Java Virtual Machine, Constants and Variables, Declaration of

Variables, Scope of Variables, Data types, Symbolic Constants, Type Casting, Command line arguments

OPERATORS - Operators, Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Increment and Decrement, Conditional Operators, Special Operators, Assignment Operators, Expression & its evaluation

CONTROL STATEMENTS - Introduction, Control Statements, Sequence Control Statement, Decision Control Statement, Case Control Statement, Iteration Control Statement, Jump in loops, Labelled Loops

ARRAYS AND STRINGS - Introduction, Array, Need of Array, Types of Array, One dimensional Array, Two-Dimensional Array, Multidimensional Array, Strings, Concatenation of Strings, Methods for String Comparison, Methods for searching Strings, Changing the case of characters, String Buffer

CLASSES - Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class members, Call by value and call by reference, Recursion, Access Control, Constructors, Method overloading, Constructor Overloading, Garbage Collection, finalize() method, this keyword, Static Members, Nesting of Methods

INHERITANCE - Inheritance, Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Using Super, Constructor -Order of Execution in Inheritance, Overriding methods, Final variables and methods, Final Classes, Abstract methods and Classes, Containership, Visibility Control

WRAPPER CLASSES AND VECTORS - Introduction, Wrapper Classes, Number Class, Byte class, Short class, Integer class, Long class, Converting Numbers to and from Strings, Float class, Double class, Character class, Boolean class, Vectors, Creating a vector

INTERFACE & PACKAGES - Introduction, Interfaces, Defining interface, Implementing interface, Accessing interface method, Accessing interface variable, Extending interfaces, Packages, System packages, Using system packages, User defined packages, Adding class to a package, Accessing and using package

EXCEPTION HANDLING - Introduction, Exceptions, Using try & catch, Multiple catch clauses, Finally, Throw, Throws

MULTITHREADING - Introduction, The Main Thread, Creating Threads, Life cycle of Thread, Using Threads Methods, Thread Priorities, Stopping and Blocking a thread, Thread Exceptions, Using is Alive() and join(), Synchronization

APPLETS - Introduction, Local & remote applets, Applet vs applications, Writing applets, Life cycle of an applet, Creating source code of applet, Creating an executable applet, Creating applet tag, Adding applet tag to html, Running the applet, Detailed form of applet tag, Passing parameters to applet, Aligning the display, Html tags, Getting input from user

INPUT-OUTPUT STREAMS AND FILE MANAGEMENT - Introduction, Stream, Stream Classes, Byte Stream Classes, Character Stream Classes, System Class, Reading Console Input, Writing Console Output, Using the File Class, Random Access File

GRAPHICS PROGRAMMING - Introduction, The Graphics Class, Drawing Lines and Rectangles, Using drawOval() and fillOval() method, Drawing arcs, Drawing Polygon, Line Graphs, Drawing Bar Charts

3MSCIT3-SOFTWARE ENGINEERING

Introduction to software engineering - introduction, reusable software components, what is well engineered software ?, programming and software engineering, what is software engineering ?, goals of software engineering, software processes, software process models, process iteration, other important software models

Software project management - project management, management activities, project planning, project scheduling, risk management, selecting staff, metrics used for measuring the software cost, cocomo model

Software process and project metric - software quality, metrics for the analysis model, metrics for the design model, metrics for source code, metrics for testing

Software project planning - introduction, software project planning, other planning activities, organisation of the software project, management plan (smp) document

Software cost estimation - introduction, software cost factors, programmer's ability, product complexity, product size, required level of reliability, level of technology, decomposition technique, empirical estimation models, the structure of estimation models

Software project requirements - software requirements, functional and non-functional requirements, user requirements, system requirements, software requirements document

Requirements engineering process - requirements engineering process, feasibility study, requirements elicitation and analysis, scenarios, requirements specification, ethnography, requirements validation, requirements management

Software prototyping - software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping

Analysis concept and modeling - analysis modeling, context model, data modeling concepts, cardinality and modality, flow oriented diagram, data dictionary

Design concepts and principles - introduction, design within the context of software engineering, design process and design quality, design concepts, information hiding, functional independence, design classes, the design model, software patterns

Software architecture - software architecture data design, architectural styles and patterns, analyzing alternative architectural designs, mapping the requirements into a software architecture, architectural design

Designing the user interface - user interface, input design, end-user considerations for input design, output design, design principles, screens, forms, menu, messages, importance of code, data codification schemes, designing code less systems

Software quality management, software quality management, role of a software quality manager, ISO quality model, quality assurance standards, quality planning, quality control, software reviews, software reliability

Verification and validation - verification and validation, software testing, verification and validation planning, software inspections, automated static analysis, cleanroom software development

Software testing models - software testing fundamentals , black-box and white-box testing, white-box testing, basis path testing, control structure testing, black-box testing, object-oriented testing methods

Software testing strategies - the strategic approach, the software testing strategy, strategic issues, unit testing, integration testing, validation testing, system testing, test automation

Computer aided software engineering (CASE) - computer aided software engineering (CASE), case workbenches, integrating case environment, need of software reuse:, types of reuse, reuse

3MSCIT4-A. COMPUTER ARCHITECTURE

INTRODUCTION- Digital Computers , Computer Architecture , Computer Organization, Difference between Computer Architecture and Organization, Structure and Functions, Summary, Exercise

BASIC ARRANGEMENT OF A COMPUTER SYSTEM - Computer , Basic organization of a computer system, Types of computers, Microprocessor (μ p), Working of Microprocessor, Microprocessor 8085 Architecture, Speed of Microprocessors, Summary, Exercise

NUMBER SYSTEM AND ITS REPRESENTATION - Data Types, Number System, Number System Conversion, Binary Arithmetic, Integer and Floating Point Representation Overflow Underflow

COMPUTER CODES - Introduction, BCD (Binary Coded decimal) Code, EBCDIC Code, ASCII Code, Excess-3 Code, Gray Code, Error Detection Code, Error Correction Code

BASIC BUILDING BLOCKS - Logic Gates , Universal Gates, Exclusive Gates, Bubbled Gates, Universality of NAND and NOR gates

BOOLEAN ALGEBRA - Boolean Variable, Boolean Algebra, Boolean Functions and Truth Tables, Logic Diagram, Laws of Boolean Algebra, Rules for Boolean Algebra, Demorgan's theorems, Simplification of Boolean Functions, Implementation Using Basic Gates, To Obtain Expression from Logic Circuits

KARNAUGH MAP - Introduction, Algebraic Expression by Karnaugh Map, Simplification of Boolean Expression using K Map, Simplification of Boolean expression using K-map, Don't care conditions

DIGITAL LOGIC CIRCUITS - Introduction, Combinational Logic Circuit , Sequential Logic Circuits

BASIC COMPUTER ORGANIZATION - Register Transfer language and Micro-operations, Instruction Codes , Instruction Set, Operations and Operands, Computer Registers, Instruction Format, Instruction Cycle, Addressing Modes, Real and Protected Addressing Modes, Assembly Language Programming, Input-Output and Interrupt

Von Neumann Architecture- Data Path and Memory Bus, Arithmetic and Logic Unit (ALU), Memory, Static Random Access Memory (SRAM), Dynamic Random Access Memory (DRAM), Control Unit (CU), Register Transfer Language, Execution of Instructions, Microarchitecture, Complex and reduced instruction sets (CISC/RISC), Input/Output

CENTRAL PROCESSING UNIT DESIGN - Central Processing Unit (CPU), BUS Organization, Register Organization, Stack Organization, Data Path and Control Signals, Types of Processor (CPU) , Micro Programmed Control and Hardwired Control, Pipelining, Software - Hardware Interaction layers in Computer Architecture

INPUT-OUTPUT ORGANIZATION, Transfer of Information between I/O Devices, CPU & Memory, Data Transfer Format , Types of Data Transfer , I/O Interface , Modes of Data Transfer , I/O Channels and Processors, Input/Output Identification (Peripheral or Memory Mapped), Conditions of Data Transfer

MEMORY ORGANIZATION - Computer Memory, Characteristics of Memory, Units of Memory, Data Accessing/Storing Methods in Computer Memory, Memory Hierarchy, Classification of Memory, Associative Memory, Virtual Memory, Memory Management System

Optimizing Hardware Performance - Memory Hierarchy, Cache, Virtual Memory, Pipelining, Pipelining Hazards, Conclusion, Superscalar CPU, Brief Historical Detour into Supercomputing, Superscalar Principle

3MSCIT5-C. ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

Introduction to Artificial Intelligence, Overview and definition of AI, Importance of AI, Early work in AI, General issues in AI, Problems of AI, AI Techniques, Scope and Application areas of AI

Problem Solving and Search, State Space Search for problem solving, Production System, Search and Control Strategies, Breadth First Search, Depth First Search, Heuristic Search, Production System Characteristics, Problem characteristics, Some other Control Strategies, Uniform cost search, Depth-limited search, Iterative deepening search, Adversarial Search, Two agent Games, The Minimax procedure, Example Problems, -Puzzle Problem and Playing Chess, Traveling Salesman Problem, Tic-Tac-Toc Problem, Water Jug Problem

Heuristic Search Techniques, Introduction, A General Graph Searching Algorithm, Generate and Test, Hill Climbing Search, Best First Search and A* algorithm, Admissibility of A*, Monotone or Consistency Condition, Problem Reduction, AND-OR TREE, Constraint Satisfaction, Cryptarithmic Problem

Knowledge Representation and Logic, Introduction and Importance of Knowledge, Characteristics of Knowledge, Explicit and Implicit Knowledge, Declarative or Procedural knowledge, Internal vs. External Knowledge, Mappings and Knowledge representation Methods, Issues in Knowledge representation, Important Attributes, Relationship among attributes, Granularity of representation, Representing set of objects, Finding the Suitable structure

First order logic or predicate calculus, Introduction, Syntax and Semantix, Exentions and Notational Variations, Representing Simple facts in Predicate Logic, Representing Instance and ISA Relationships, Inference in First Order Logic, Inference Rules Involving Quantifiers, Generalized Modus Ponens, Canonical Form, Unification, Forward and Backward Chaining, A Complete Inference Procedure: Resolution, The Resolution Inference Rule, Canonical Form for Resolution, Resolution Proofs, Conversion to Normal Form (Skolimization), Conversion to Clause Form, Resolution control strategies, Unit Preference, Set of support, Linear Input Resolution, Subsumption, Natural Deduction and Question Answering

Knowledge Representation Using Rules, Representing Knowledge Using Rules, Procedural V/S Declarative Knowledge, Logic Programming, Forward and Backward Reasoning, Matching, Indexing, Matching with Variable, Complex and Approximate Matching, Conflict Resolution, Control Knowledge

Symbolic and Statistical Reasoning, Symbolic Reasoning Under Uncertainty, Introduction to Reasoning, Nonmonotonic Reasoning and its Logics, Implementation Issues, Implementation: Depth – First Search, Implementation: Breadth – First Search, Statistical Reasoning, Symbolic Verses Statistical Reasoning

Structural Knowledge Representation, Weak Slot and filter structures, Semantic nets, Intersection search, Non-binary predicates Representation, Essential distinctions, Partitioned semantic nets, Semantic nets to Frames, Frames, Frames as sets and instances, Additional ways of relating classes to each other, Slots and full-fledged objects, Property Inheritance algorithm, Languages for Frame, Strong slot and filter structures, Conceptual Dependency, Scripts, CYC

NLP : Natural Language Processing, Introduction, Computational linguistics, Problems of NLP, NLP Steps, Syntactic processing, Grammars, parsers, One or many Interpretations, Parsing techniques, Transition networks and augmented transition net, Unification Grammar, Semantic analysis, Semantic grammars, Case grammars, Conceptual parsing, Sementic interpretation, Discourse & pragmatic processing, Focus use in understanding, Modeling beliefs, Use of goals and plans for understanding, Acts of speech, Postulates of conversation

Expert system, Introduction, Need and Justification, Benefits of using ES, Characteristics, Applications, Building blocks of Expert system, Knowledge Base, Inference Engine, User

Interface, Expert System Life Cycle, Representing and Using Domain Knowledge, Knowledge Engineering and Acquisition, Expert System Tools, Expert System Shells, Case Study: Mycin & Dendral, Rule Based Systems, Learning Procedure

PROLOG: AI Programming Language, Introduction, Data Types & Structures: Atom, Variables, Lists, Prolog Syntax and Programming, Prolog Objects and Methods, Objects & Relationships using Trees and Lists, Facts, rules, Relationships and queries, 'IS' Operator & Singleton Variable, 'CUT' Operator

FOURTH SEMESTER

4MSCIT1-COMPUTER GRAPHICS

Introduction to Computer Graphics - introduction to computer graphics, advantages of computer graphics, applications of computer graphics, classification of computer graphics, graphics standards, graphical user interface, basic elements of graphics

Graphical Input Devices - Introduction, Keyboard, Mouse, Trackball, Trackpads, Touch Screens/panels, Automatic Teller Machine, Joystick, Light Pen, Data Glove, image scanners, Digitizers/digitizing or graphic tablets

Graphical Output Devices - Introduction, hard copy and soft copy output devices, graphical Display or soft copy Devices, Monitor, Raster Scan and Random scan displays, Display technologies, Cathode Ray Tube (CRT) Displays, Flat Panel Displays, Characteristics OF A Monitor, video/Display Adapters, Modes, HARD COPY DEVICES

Drawing Geometry : Line & Circle Generation, Introduction, lines, Line Segments, Vectors, Vector Generation, Thick Lines, Basic Concepts in Circle Drawing, Circle Drawing Algorithms, Ellipse Drawing Algorithm

Aliasing, Antialiasing and Character Generation - Aliasing and Antialiasing, Character Generation, Normalized Device Co-ordinates, Display of Frame Buffer

Polygon Representation and Filling - Introduction, Types of Polygons, Representation of Polygons, Entering Polygons, An Inside Test, Polygon Filling, Filling with Patterns, Scan Conversion

2D Geometric Transformation - Introduction, Matrices, Transformations, Homogeneous Co-ordinates, Composition of 2D Transformations, Other Transformations

2D Viewing Transformation and Clipping - Introduction, Viewing Transformation, More about Viewport and Window, Two-Dimensional Viewing Functions, Clipping, Cohen-Sutherland Subdivision Line Clipping Algorithm, Midpoint Subdivision Algorithm, Polygon Clipping, Sutherland - Hodgeman Polygon Clipping Algorithm

3D Geometric Transformation - Introduction, 3D Geometry, 3D Primitives, Techniques to Achieve Realism, 3D Geometric transformations, Reflection with Respect to Given Plane, Reflection with Respect to Any Plane

3D Display Methods - Three Dimensional Viewing, Viewing Parameters, Transformation from World co-ordinate to, Viewing co-ordinates, Projections, 3D Clipping, 3D Midpoint Subdivision Algorithm

Segments - Introduction, Segment Table, Functions for Segmenting the Display File, More about Segments, Image Transformation, Raster Techniques, Animation using Segmentation

Curve Generation - Introduction, Curve Generation, Interpolation, Interpolating Polygons, Spline Representation, Bezier Curves, B-Spline Curves, hidden surface, Back face Removal Algorithm, Z-Buffer Algorithm, Scan Line Algorithm, Painter's Algorithm (Depth Sort Algorithm)

4MSCIT2-DATA WAREHOUSING & MINING

Strategic Information Management, Need for strategic information, Decision support system, Knowledge discovery & decision making, Need for data warehouse, Definitions of Data warehousing and data mining, Common characteristics of Data warehouse, Data Marts, Metadata, Operational versus analytical databases, Trends and planning of Data warehousing.

Data Modeling Strategy, Defining business requirements, Data modeling strategy, Fact tables, Dimensions, Star schema and other schemas, Multi dimensional data models, Data Cube presentation of fact tables, Using the Data warehouse, Designing tools for Data warehouse, OLAP models and operations.

Data Warehouse Architecture Components and Implementation Options, Architectural components, Infrastructure: Operational & Physical, Extraction, Transformation and Loading, Components of an Oracle Data warehouse, Data Transformation Functions, DBA responsibilities, Capacity Planning. .

Data Warehouse Implementation, Implementation of Data warehouse, Physical design: steps, considerations, physical storage, indexing, Performance Optimization, Data warehouse deployment activities, Data security, Backup and recovery concepts, Data warehouse Maintenance.

Data Mining, Basics of data mining, Related concepts, Data mining techniques, Data Mining Algorithms , Classification, Clustering and Association rules, Knowledge Discovery in databases(KDD) Process, Introduction to Web Mining;

4MSCIT3-A. ADVANCED JAVA PROGRAMMING

EXCEPTION HANDLING - Introduction, Exceptions, Using try & catch, Multiple catch clauses, Finally, Throw, Throws

MULTITHREADING - Introduction, The Main Thread, Creating Threads, Life cycle of Thread, Using Threads Methods, Thread Priorities, Stopping and Blocking a thread, Thread Exceptions, Using is Alive() and join(), Synchronization

APPLETS - Introduction, Local & remote applets, Applet vs applications, Writing applets, Life cycle of an applet, Creating source code of applet, Creating an executable applet, Creating applet tag, Adding applet tag to html, Running the applet, Detailed form of applet tag, Passing parameters to applet, Aligning the display, Html tags, Getting input from user

Using Standard Java Packages, Exploring java Input Output Classes

Exploring Java.util package- Interface summary, Class summary, Collection Framework, Core collection Interface, Set Interface, List Interface, Map Interface, StoredMap, Interface Iterator.

Networking in Java-Network Basics, Java & Networking – Sockets & Ports, Client Server architecture, TCP, UDP, Server Sockets ad Datagram, Networking classes in JDK

TCP/IP & Datagram Programming in Java – Socket Programming Basics, Datagram Communication, TCP/IP Sokect Programming in Java.

AWT – AWT Programming basics, Working with Windows, Graphics & Text.

Multimedia in Java- Handling images, sound and animations in Java

Event Handling in Java-Handling of various events in Java, Handling Mouse & Keyboards events

Swing Classes.

4MSCIT4-A. DISCRETE MATHEMATICS

SET THEORY - Set and Subsets, Operations on Sets, Countable and Uncountable Sets, The Principle of Inc Inclusion-Exclusion, Derangements, Propositions

PERMUTATION, COMBINATIONS, DISCRETE PROBABILITIES - The rules of sum and product, Permutations, Combinations, Binomial and Multinomial Theorems, Combinations with Repetitions, Probability, Random Variables & Probability Distributions, Repeated Trials

RELATION AND FUNCTION- Cartesian (Cross) Product of Sets, Relation, Operation on Relations, Properties of Relation as Binary Relation on a Set, Two Important Relations, Partial Ordered Relation, Lattices, Functions - Mappings, Types of Functions, Cardinality of Set, Composition of Relation and Function, Composition of Function, Existence of Inverse Function (Mapping), Set Image/Preset Image of Function

Graph - Directed Graphs, Graphs, Isomorphism, Subgraphs, Operations on Graphs, Walks and their classification, Connected and Disconnected Graphs, Euler circuits Euler trails, Planar and non-planar graphs

Recurrence relations - First-order Recurrence Relations, Second-order Homogeneous Recurrence Relations, Third and higher-order Homogeneous Recurrence Relations, Non-homogenous Recurrence Relations of second and higher orders, Method of Generating Functions

Groups - Introduction, Important Examples, Necessary and sufficient Condition for any subset of a group to be subgroup, Partition of a Group, Characteristics of Cosets of a Subgroups, Normal Subgroups, Necessary and sufficient condition for any subgroup of group to be normal subgroup, Characteristics of Normal (Sub groups), Quotient groups, Concept of Homomorphism, Rings, Some special types of Rings, Elementary Properties of Rings, Subrings, Results of Sub-rings of a ring, Standard Properties of ideals, Homomorphism of Rings, Properties of Homomorphism

Discrete Numeric Functions and Generating Functions -Discrete Numeric Functions, Manipulation of Numeric Functions, Asymptotic Behavior of Numeric Functions, Binomial Coefficients

4MSCIT5-MAJOR PROJECT

All the candidates of MSC(IT) are required to submit a project-report based on the work done by him/her during the project period. A detailed Viva shall be conducted by an external examiner based on the project report. Students are advised to see the detailed project related guidelines on the website of CVRU. (www.cvru.ac.in) under Project Guidelines for student section.

