TAMIL NADU OPEN UNIVERSITY
SCHOOL OF COMPUTER SCIENCE
Master of Computer Applications
(Distance Mode – Non -Semester)

PROGRAMME LEARNING OBJECTIVES (PLOs)

PLO1: provide educational opportunities for higher education through distance mode for a large segment of the population, including those in employment, women and adults who wish to upgrade their education or acquire knowledge in various fields of study.

PLO2: Bridge the gap between industry and academia by framing curricula and syllabi based on industrial and societal needs.

PLO3: Develop the abilities to face the changing trends and career opportunities in computer application.

PLO4: Provide theoretical as well as practical knowledge on upcoming technologies and demonstrate application of technical principles in a professional work setting.

PLO5: Embed strong human values and professional ethics for becoming social responsibilities.

PLO6: Apply current tools, technologies and research to create systems for solving industry oriented problems.

PROGRAMME SPECIFIC OBJECTIVES (PSO)

PSO1: Apply the knowledge of computing fundamentals to a variety of real life applications for any given constraint.

PSO2: Cater the challenging opportunities being faced in Information Technology by the students.

PSO3: Incorporate and apply efficiently the current IT tools to all computer applications.

PSO4: Utilize the computing knowledge proficiently in research projects with concern for societal and environmental aspects.

PSO5: Create and plan new technologies to solve complex problems for the development of the society.

PSO6: Apply the programming skills with complete focus to become a successful entrepreneur.

Master of Computer Applications and Lateral Entry
Distance Mode – Non-Semester Pattern

Course	Course Code	Course Title	Credits	Marks Distribution		
				Internal	External	Total
	First Year					
Core -1	MCA-1	Computer Fundamentals	3	25	75	100
Core -2	MCA-2	Introduction to Software	3	25	75	100
Core -3	MCA-3	Data Structures through C	4	25	75	100
Core -4	MCA-4	Elements of System Analysis and Design	3	25	75	100
Core -5	MCA-5	Introduction to Database Management Systems	3	25	75	100
Core -6	MCA-6	Introduction to Computer Organisation	3	25	75	100
Core -7	MCA-7	Introduction to Software Engineering	4	25	75	100
Core -8	MCA-8	Computer Oriented Numerical Methods	3	25	75	100
Core -9	MCA-9	C++ and Object Oriented Programming	3	25	75	100
Core -10	MCA-10	Theory of Computer Science	3	25	75	100
Core Practical-1	MCA-P1	Lab 1 - Programming in C with Data Structure	3	25	75	100
Core Practical-2	MCA-P2	Lab 2 - Object Oriented Programming Using C++	3	25	75	100
TOTAL			38	300	900	1200
	Second Year (Lateral Entry)					
Core -11	MCA-11	Computer Graphics	4	25	75	100
Core-12	MCA-12	Design and Analysis of Algorithms	3	25	75	100
Core-13	MCA-13	Accounting and Finance on Computers	3	25	75	100
Core-14	MCA-14	Communication Skills	3	25	75	100

Core-15	MCA-15	Computer Network	3	25	75	100
Core-16	MCA-16	Operation Research	3	25	75	100
Core-17	MCA-17	Operating Systems	4	25	75	100
Core-18	MCA-18	Object Oriented Analysis and Design	3	25	75	100
Core-19	MCA-19	Internet Programming	3	25	75	100
Core-20	MCA-20	Visual Programming	3	25	75	100
Core Practical-3	MCA-P3	Lab 3 – Internet Programming and Graphics	3	25	75	100
Core Practical-4	MCA-P4	Lab 4– Visual Programming and Accounting Package	3	25	75	100
TOTAL			38	300	900	1200
Third Year						
Core-21	MCA-21	Relational Database Management Systems	4	25	75	100
Core-22	MCA-22	Client Server Technology	3	25	75	100
Core-23	MCA-23	Multimedia Systems	3	25	75	100
Core-24	MCA-24	Distributed Computing	3	25	75	100
Core-25	MCA-25	Network Programming	3	25	75	100
Core Practical-5	MCA-P5	Lab 5: Relational Database Management Systems	3	25	75	100
Skill	MCA-P6	Project Work	5	-	-	200
TOTAL			**24**	**150**	**450**	**800**
	GRAND TOTAL		**100**	**750**	**2250**	**3200**

MCA 01 Computer Fundamentals

COURSE OBJECTIVES

CO-1: Explain the various Hardware concepts. Discuss the meaning and generations of computer along with data representation and memory organization.

CO-2: Describe the Structure of CPU micro operations ,ALU and control unit, micro instructions, types , simple structure of control unit and functions.

CO-3: Comprehend the Microprocessor Architecture. Analyse the addressing modes, and Stack Addressing schemes, discuss CPU components and registers and identify the examples of Assembly program to HLL Program.

CO-4: Enumerate the Need of Multiprocessor. Recognize the Interprocessor arbitration, theories and Method of Pipelining and Comparison of various RISC architectures.

COURSE SYLLABUS

Block 1 : Hardware Concepts : Introduction – Meaning of Computer – Generation of Computers – Data Representation : Number systems – Decimal representation – Alphanumeric – Computational data – Fixed point – Decimal fixed point – Floating point – Codes Error detection and correction – Instruction execution – Digital logic circuits : Objectives – Logic gates – Boolean algebra – Elements of Combinational circuits – Elements of Sequential circuits – Interconnection structures – Memory organization : ROM/RAM – Secondary memory – High speed memory – I/O organization : I/O peripherals – I/O techniques – I/O processes – External Interface.

Block 2 : CPU Organization : Basic structure of CPU – An advanced structure – Register organization - Micro-Operations : Register transfer, Arithmetic, Logic, Shift operations – Execution of Micro-operation – ALU and Control Unit : ALU Organization – Control Unit Organization – Register Organisation and Micro-Operations - Microprogrammed Control Unit : Meaning of Micro-programmed control unit – Microinstruction : Types – Formats – Simple structure of Control unit – Functions of Control Unit.

Block 3 : Microprocessor and Assembly Language Program : Microprocessor Architecture : Components of Microcomputer – CPU components – CPU registers – Instruction set – Characteristics of Instruction set – Addressing modes : Immediate, Direct, Indirect, Register, Register Indirect, Displacement, Stack Addressing schemes – Instruction Format Design – Fundamentals of Motorola 68000 Microprocessor – Introduction to Assembly Language : Fundamentals – Program development tools – Example - Interfacing Assembly program to HLL Program.

Block 4 : Parallel Organization and RISC : Introduction – Need of Multiprocessor – Characteristics – Interconnection structures – Interprocessor arbitration – Interprocessor communication – Cache coherence – Pipeline vector processing : Objectives – Method of Pipelining – Method of vector processing – Array processors – Parallel Algorithm : Data flow

architecture – Parallel algorithms – RISC Objectives – CISC Objectives – RISC architecture – RISC pipelining – Performance analysis – Comparison of various RISC architectures.

REFERENCE BOOKS

1. Computer System Architecture by Mano M. Morris, PHI

2. Microprocessors and Interfacing – Programming and Hardware by Douglas V. Hall, McGraw Hill.

3. Computer Organization and Architecture by Stallings, William, Macmillan Int. Edn.

WEB REFERENCES:

- https://www.youtube.com/watch?v=eEo_aacpwCw-Link
- https://www.youtube.com/watch?v=OGM2BJ29Syg
- https://slideplayer.com/slide/6664305/
- https://slideplayer.com/slide/5806071/

COURSE OUTCOMES:

COC-1: Critically analyse the major issues with each computer generations. Recognizing the key role played by Codes Error detection and correction concepts plays in Memory Organization.

COC-2: Interpret the learning process and analyse the Basic structure of CPU and advanced structure along with Register organization, the role of ALU and Control Unit with the Functions of Control Unit.

COC-3: Comprehend of CPU registers, Instruction set, Characteristics of Instruction set, Addressing modes and Fundamentals of Motorola 68000 Microprocessor with examples.

COC-4: Summarize the process of Multiprocessor ,Characteristics, components of Parallel Algorithm and RISC architecture. RISC pipelining examine the Performance analysis and Comparison of various RISC architectures.

MCA 02   Introduction to Software

COURSE OBJECTIVES

CO-1: Explain the various Programming Concepts. Discuss the meaning of Multitasking,Timesharing,PseudocodeAlgorithm,CPU Scheduling along with memory management with File Management .

CO-2: Describe the UNIX Operating System , File System and File permissions, Communication between users and Super user privileges .

CO-3: Comprehend the Shell Programming. Analyse the File system mounting and unmounting and Running background processes and identify the Support for C programming Code with loops.

CO-4: Explain Software Life Cycle,Role of software engineer with Qualities of a software product and Principles of software engineering. Discuss 4GL and Natural language with case tools.

COURSE SYLLABUS

Block 1 : Programming Concepts: Introduction – Problem solving Stages – Pseudocode – Algorithm – Flowchart – Translators – Machine, Assembly and Procedural Languages – Linkers – Loaders –Elements of a programming language – Graphical User Interface (GUI) – Operating system concepts - Process Management – Multiprogramming – Multitasking – Timesharing – CPU Scheduling – Deadlock avoidance - I/O Device Management – Memory management – Partition – Partition – Page management – Swapping - File Management

Block 2 : UNIX Operating System : Foundations of UNIX operating system – Features of UNIX – Structure of UNIX operating system – File System – Different types of files – Command format – Text Manipulation commands – Text Editor – Line editors : ed,ex line editors – Vi Screen editor – Sed – File permissions – Super user, owner and other user categories and their privileges – Communication between users – Super user privileges

Block 3 : Programming in Unix : Shell Programming – Command Interpreter – Environment variables – Parameter passing – Shell programming language constructs – operators – Expression evaluation – Support for C programming Code – read, echo, if, case – Loops: do, for loops – System Administration – Adding user accounts – Changing privileges – File system mounting and unmounting – Running background processes

Block 4 : Software Engineering : Software Life Cycle – Role of software engineer – Qualities of a software product – Principles of software engineering – Trends in Software Development – 4GL and Natural Languages – System Investigations – Control of System Investigations - Case Tools

REFERENCE BOOKS

1. T.W. PRATT – Programming Languages, Design And Implementation – PHI.

2. R.G. DROMEY – How To Solve It By Computer – PHI.

3. Operating System Design And Implementation BY ANDREW S. TANENBAUM – PHI

4. SOFTWARE ENGINEERING, PRESSMAN

WEB REFERENCES

- https://study.com/academy/lesson/what-is-application-software-definition-examples-types.html
- https://www.youtube.com/watch?v=o_CeK6nhpy0
- https://quizizz.com/admin/quiz/5f2bf21bd45afc001bd5a8e7/introduction-to-software-engineering-1
- https://slideplayer.com/slide/7351079/

COURSE OUTCOMES

COC-1: Critically analyse the major issues of Process Management. Recognizing the key role played by I/O Device Management and Page management along with file management.

COC-2: Interpret the File System process and analyse the File permissions and Communication between users along with Super user privileges

COC-3: Interpret of Shell programming language, evaluation for C programming Code with Loops do, for loops and Adding user accounts with Changing privileges along with Running background processes

COC-4: Summarize the process of Software Life Cycle with Role of software engineer and Qualities of a software product with Principles of software engineering and Trends in Software Development and Examine System Investigations.

MCA 03   Data Structures through C

COURSE OBJECTIVES

CO-1: Explain the C Programming language. Discuss the Structure of a C program, operators along with control structures and pointers.
CO-2: Describe the structure of C programming. Arrays with structure and functions,Declaration call by value and call by reference, Files and pointers to function.

CO-3: Comprehend the data structure in C. Analyse the Linked list and structure with Matrix and identify the Graph Traversals.

CO-4: Explain tree searching ,Sorting with tree traversal,AVL trees. Discuss Sorting techniques along with file organizations.

COURSE SYLLABUS

Block 1 : C Programming Language Fundamentals: Introduction – C Programming language – Structure of a C program – Pre-processor Directives – **main()** function – Data Types – Constants, Variables – Operators: Arithmetic, Relational, Logical, Assignment, Increment, Decrement, Bitwise, Miscellaneous operators - Input and Output functions – C programming IDE – Compiling and Running a simple program – C library functions through header files – Control Structures – if, switch, goto, for, while, do loops – Pointers

Block 2 : Structured Programming with C : Arrays – Single and Multi-Dimensional arrays – Character arrays – Structures – Unions – Bit fields – Storage Classes: auto, register, extern – Functions – Definition – Declaration – Call by Value – Call by Reference – Passing arrays – Passing a function to function – Pointer to function – Files: Text, binary files – Random access in files

Block 3 : Data Structures in C : Stack, Queue structures Defined – Implementation of stack and queue structures using array in C – Linked List : Singly, Two-way, Circular list –

Implementation of linked list structure in C – Graphs – Adjacency matrix – Implementation of a directed graph in C – Graph Traversals: Depth First Search – Breadth First Search.

Block 4 : Tree, Searching and Sorting : Trees – Binary Tree – Representation of Binary tree in memory – Tree Traversals : Preorder – Postorder – Inorder - AVL-Trees and B-Tree – Implementation of trees in C – Searching and Sorting Techniques: Linear and Binary search – Sorting Techniques: Selection, Insertion, Quick, Heap and Two-way merge sort techniques implemented in C – File Organizations: Sequential, Indexed Sequential and direct organizations.

REFERENCES

1. Data Structures Using C Yedidyah Langsam,Moshe J.Augenstein,Aaron M.Tenenbaum, PHI

2. Data Structures, Dale and Lilly.

WEB REFERENCES

- https://www.mygreatlearning.com/blog/data-structures-using-c/
- https://www.youtube.com/watch?v=Db9ZYbJONHc
- https://www.youtube.com/watch?v=11i8bRojtYk
- https://www.javatpoint.com/data-structure-tutorial

COURSE OUTCOMES

COC-1: Critically analyse the major issues of Operators. Recognizing the key role played by Data types and functions along with pointers.

COC-2: Interpret the array and its working process and analyse the pointer functions and Call by value, call by reference.

COC-3: Considerate of Linked List, evaluation for Stack, Queue with Changing privileges of Random Access file.

COC-4: Summarize the process of Tree traversal and quick sort with Heap Sort in C, Examine File organization System.

MCA 04 Elements of System Analysis and Design

COURSE OBJECTIVES

CO-1: Explain the System with Elements . Discuss the System development, System development Life cycle along with Feasibility study.
CO-2: Describe the structure of C programming. Arrays with structure and functions,Declaration call by value and call by reference, Files and pointers to function.

CO-3: Comprehend the Task of system development. Analyse the quality assurance with Levels of testing and identify the conversion methods.

CO-4: Explain Human problems in Automated office, Components of Multimedia, Evaluation and Selection of a system. Discuss Simple case studies.

COURSE SYLLABUS

Block 1 : Introduction – Definition of a System – Characteristics of a system – Elements of Systems Analysis – System development life cycle – Software crisis – Role of Systems Analyst – Project Selection : Project request – Managing Project selection – Preliminary investigation – Problem classification and definition – Feasibility study : Types of feasibility – Investigative study – Cost Benefit Analysis – Fact finding techniques – DFD – Data Dictionaries – HIPO – Decision tables and Decision Trees – Warnier Orr Diagrams.

Block 2 : Structured System Design : Introduction – Design Methodologies – Structured Design – Modularization – Design process – Systems Specifications – Prototype design – Input design and control : Elements of Input data – Processing transaction data – Design guidelines – Input verifications and control – Layout of Terminal screen – Output System design – Output devices – Types of Output – Designing screen output/report – Form design – File and Database design – Types of file – File Organisation – File design – Database Design – Coding system – Types of Code.

Block 3 : System Development : Task of System development – Selection of Hardware and Software – Benchmark testing – Software selection criteria – Quality Assurance – Levels – Maintenance Issues – Levels of Test – Testing plan – Designing test data – System control – Documentation : Characteristics – Types of Documentation – Need for documentation – Tools – System Implementation : Conversion methods – Post Implementation Review – Review Plan – System Maintenance – MIS : Concept – Overview of Computing, Communication and Database technologies – DSS – Knowledge based system – Impact of MIS – Building MIS : Techniques

Block 4 : Emerging Trends – Attributes of a Good Analyst – Organisational Issues – Communicating with Computers – Ergonomics – Human problems in Automated office - Multimedia : Introduction – Components of Multimedia – Hardware and Software requirements – Simple case studies : Information system planning – Evaluation and Selection of a system.

REFERENCE BOOKS

1. Systems Analysis and Design by James. A. Senn

2. Systems Analysis and Design by Elias M. Award.

WEB REFERENCES

- https://www.youtube.com/watch?v=Vjpu_P-LHTo
- https://www.tutorialspoint.com/system_analysis_and_design/system_analysis_and_design_overview.htm#:~:text=System%20analysis%20is%20conducted%20for,what%20the%20system%20should%20do.
- https://www.studocu.com/in/document/dmi-st-eugene-university/system-analysis-and-design/system-analysis-and-design-notes/5911719

COURSE OUTCOMES

COC-1: Critically analyse the Role of Systems Analyst. Recognizing the key role played by System development life cycle and Warnier Orr Diagrams.

COC-2: Interpret the Modularization and Feasibility study and analyse the Cost Benefit Analysis and Coding system ,Types of Code.

COC-3: Considerate of Testing Plan, evaluation for DSS, Impact of MIS Techniques.

COC-4: Summarize the human problems in automated office, Hardware and software requirements, and components of Multimedia and hardware software requirements. Evaluation and selection of a system.

MCA 05 Introduction to Database Management System

COURSE OBJECTIVES:

CO-1: Explain the DBMS with architecture. Discuss the Database Models, Hierarchical Model, And Network Model Along With Relational Model.
CO-2: Describe the file organization. Administration of DBMS, Evaluation of DBMS and its Objectives.

CO-3: Comprehend the Relational algebra and relational completeness. Analyse the Anomalies in a database with Data Manipulation statements and identify the Types of SQL commands.

CO-4: Explain Object Oriented system along with DBMS and Pitfalls of RDBMS, Components of OODBMS,Client/Server Database, Evaluation and Selection of Knowledge base Management system. Discuss Difference of KBMS and DBMS.

COURSE SYLLABUS

Block 1 : DBMS concepts : Introduction – Basics of Database – Three views of Data – Three level architecture of DBMS – Facilities – Elements of DBMS – Advantages and disadvantages – Database Models : File Management system and its drawbacks – Database Models : E-R Model, Hierarchical Model, Network Model, Relational Model.

Block 2: File Organization: Introduction – Methods of File Organization – Sequential, Direct, Index Sequential – Multi Key file organization – Management Considerations: Objectives – Conversion – Evaluation of DBMS – Administration of DBMS.

Block 3 : RDBMS and DDBMS : Introduction – Relational Model – Concept – Definition of a relation – Relational algebra and relational completeness – Normalization : Objectives – Functional dependency – Anomalies in a database – Properties of Normalization – Various Normalization techniques – Examples of database design – SQL : Types of SQL commands – Data definition – Data Manipulation statements – Distributed Databases : Structure of Distributed database – Design of Distributed database.

Block 4 : Trends in DBMS : Objectives – Next generation Database – Application – Object Oriented system – Object Oriented DBMS – Pitfalls of RDBMS – Comparison of RDBMS and OODBMS – Client/Server Database : Objective – Evolution – Client/Server computing – Critical Products – Knowledge base Management system : Objectives – Definition and importance of Knowledge – Difference of KBMS and DBMS.

REFERENCE BOOKS

1. DATABASE SYSTEM CONCEPTS BY SILBERSCHATZ, KORTH AND SUDARSHAN, MCGRAW HILL.

2. AN INTRODUCTION TO DATABASE SYSTEMS BY BIBIN C. DESAI, GALGOTIA PUBLICATIONS.

WEB REFERENCES

- https://www.guru99.com/dbms-tutorial.html
- https://cs.ulb.ac.be/public/_media/teaching/infoh303/dbmsnotes.pdf
- https://www.javatpoint.com/dbms-tutorial
- https://www.youtube.com/watch?v=f1oV46r69YM
- https://www.techtarget.com/searchdatamanagement/definition/database-management-system

COURSE OUTCOMES

COC-1: Critically analyse the Role Elements of DBMS. Recognizing the Advantages and disadvantages of Database Models.

COC-2: Interpret the Methods of File Organization, Management Considerations and analyse the Administration of DBMS and Multi Key file organization.

COC-3: Considerate of Testing Plan, evaluation for DSS, Impact of MIS Techniques.

COC-4: Summarize the Difference of KBMS and DBMS, Comparison of RDBMS and OODBMS. Definition and importance of Knowledge.

MCA 06 Introduction to Computer Organisation

COURSE OBJECTIVES

CO-1: Explain the Data representation. Discuss the Von Neumann Architecture, Digital Logic Circuits, Logic Gates, and Combinational Circuits along with Sequential data.
CO-2: Describe the Peripheral Devices and Types of Auxiliary memory and Associated Memory, Declaration of I/O Techniques, DMA, I/O processes,External Interface.

CO-3: Comprehend the Addressing Modes, Instruction format. Analyse the **Cache Memory** with Register Organization and identify the sequencing of Microinstruction Execution.

CO-4: Explain CPU components along with components of 68000 microprocessor, Evaluation of Assembly language program development tools of a system. Discuss Modular program with Interface to high level program and Interrupts.

COURSE SYLLABUS

Block-1 : Data Representation : Introduction – The Von Neumann Architecture – Generation of Computers – Data Representation : Decimal – Alphanumeric – Fixed – Decimal Fixed – Floating point – Error Detection and Correction codes – Instruction Execution. Digital Logic Circuits – Introduction – Boolean Algebra – Logic Gates – Combinational Circuits – Sequential Circuits – Inter connection structures.

Block-2 : Pheripheral Devices : Memory Organization : Introduction – various memory devices – Types of Random Access Memory – Types of Auxiliary memory – High Speed Memories : Cache Memory – Interleaved Memory – Associated Memory. IO Organization : I/O Model – I/O Techniques – DMA – I/O processes – External Interface.

Block-3 : Instruction Set : Introduction – Characteristics – Addressing Modes – Instruction format – Examples. Registers organization : Structure of CPU – Register Organization – Micro operation – ALU Organisation – Control Unit Organisation – Microprogrammed Control Unit – Microinstruction: sequencing – Microinstruction Execution.

Block–4 : Microprocessor and Assembly Language Programming : Introduction – Microcomputer architecture – CPU components – Instruction set – Introduction to Motorola 68000 microprocessor – Assembly Language : Introduction – Assembly language fundamentals – I/O services – Assembly language program development tools – Examples : COM programs – EXE programs – Simple assembly language programs – Programming with loops and strings – Arrays – Modular program – Interface to high level program – Interrupts.

REFERENCES

1. MANO M.MORRIS, COMPUTER SYSTEM ARCHITECTURE, THIRD EDITION, PRENTICE HALL OF INDIA (1983)

2. HAYES,JOHN.P, COMPUTER ARCHITECTURE AND ORGANISATION, SECOND EDITION, MCGRAW HILL INTERNATIONAL EDITIONS, 1988

3. DOUGHLAS V.HALL, MICROPROCESSORS AND INTERFACING – PROGRAMMING AND HARDWARE- MCGRAW HILL, 1986.

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- https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/
- https://www.youtube.com/watch?v=Ol8D69VKX2k

COURSE OUTCOMES

COC-1: Critically analyse the CPU components and Instruction set. Recognizing the COM programs and EXE programs and Programming with loops, strings and Arrays.

COC-2: Interpret the ALU Organisation and analyse the Control Unit Organisation with Micro programmed Control Unit Analyse the Microinstruction sequencing

COC-3: Considerate of Structure of CPU, evaluation for Control Unit Organisation, Impact of Registers organization.

COC-4: Summarize the Microprocessor and Assembly Language Programming,Modular program, components of Multimedia and hardware software requirements. Evaluation and selection Programming with loops and strings.

MCA 07 Introduction to Software Engineering

COURSE OBJECTIVES

CO-1: Explain the **Software Engineering Concept**. Discuss the Phases in Software development, Software Process Models along with Prototyping and RAD.

CO-2: Describe the Project Development Team Structures. Project planning and control with Estimation Models and Risk management.

CO-3: Comprehend the Task set for the software project and Scheduling Plan. Analyse the Software Reliability, ISO 9000 quality standards with Software Configuration management.

CO-4: Explain Software Analysis, Design and Testing, Components of Multimedia, Evaluation and Selection of Art of debugging and Discuss Case study.

COURSE SYLLABUS

Block 1 : Software Engineering Concept : Definition – Software Product – Components and characteristics – Phases in Software development – Software Process Models: Linear Sequential – Prototyping – RAD – Spiral – Incremental – Formal methods – Fourth generation techniques.
Block 2 : Project Management Concepts : People – Product – Process – Project Development Team Structures - Software Crisis – Role of System Analyst – Project planning and control : Planning objectives – Software scope – Resources – Project Estimation – Decomposition Techniques – Estimation Models – Project standards – Outsourcing – Risk Management : Risk – Identification – Projection – Refinement – Mitigation.
Block 3: Project Scheduling and Tracking: Basic concepts – Defining task set for the software project – Scheduling Plan – Software Quality Assurance: Quality concepts – Quality Assurance Activities – Software Reviews – Formal Technical Reviews – Software Reliability – ISO 9000 quality standards – Software Configuration management.
Block 4 : Software Analysis, Design and Testing : Analysis concepts and principles – Software prototyping – Specification Modelling and Information flow – Behavioural Modelling – Design

Concepts and principles – Modular design – Architectural design and process – User Interface design – Software Testing : Principles – Test case design – White Box test – Block box testing – Testing Strategies : Unit – Integration – Validation – System – Art of debugging – Case study.

REFERENCES

1. SOFTWARE ENGINEERING PRACTITIONER'S APPROACH BY ROGER S. PRESSMAN

2. SOFTWARE ENGINEERING CONCEPTS BY RICHARD AND FAIRLAY

3. AN INTEGRATED APPROACH TO SOFTWARE ENGINEERING BY PANKAJ JALOTE

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- https://gradle.com/blog/developer-productivity-engineering-2020/
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- https://sstegnoor.com/bca-6th-semester/

COURSE OUTCOMES

COC-1: Critically analyse the Linear Sequential with Prototyping and RAD,Spiral. Recognizing the Fourth generation techniques.

COC-2: Interpret the Risk Management and Refinement with Estimation Models and Project standards and analyse the Software Crisis, Team structures.

COC-3: Considerate Software Quality Assurance, evaluation for Software Configuration management and formal Technical Reviews.

COC-4: Summarize the Behavioural Modelling and prototyping along with Art of debugging with few case studies.

MCA 08 Computer Oriented Numerical Methods

COURSE OBJECTIVES

CO-1: Explain the Computer Arithmetic and Solution of Non-Linear Equations. Discuss the Propagated Error with Pitfalls in Computation and Sources of Errors along Newton's Raphson bisection.
CO-2: Describe the Cramer's Rule,Gauss elimination method and Pivoting Strategies .
CO-3: Comprehend the Inverse Interpolation. Analyse the square approximation of functions - linear and polynomial regressions.

CO-4: Explain Problem of Interpolation in Automated office, Components of Multimedia, Evaluation and Selection of Error of the Interpolating Polynomial. Discuss least square approximation of functions and linear and polynomial regressions.

COURSE SYLLABUS

Block 1 : Computer Arithmetic and Solution of Non-Linear Equations : Introduction – Floating Point Arithmetic and Errors: Floating point represent of Numbers – Sources of Errors – Non-Associativity of Arithmetic – Propagated Errors – Pitfalls in Computation. Solution of Non-Linear equations: Bisection – Fixed point – Regula falsi – Newton's Raphson – Secant method. Convergence criteria of Iterative methods.

Block 2 : Solution of simultaneous Linear Algebraic Equations and ordinary differential equations : Cramer's Rule - Gauss elimination method – Pivoting Strategies - Gauss Jordan method – Jacobi Iterative method – Gauss Seidal method –Comparison of Direct and Iterative methods.

Block 3: Interpolation and Curve Fitting: Problem of Interpolation - Langranges method of Interpolation – Inverse Interpolation – Newton's interpolation formulae – Error of the Interpolating Polynomial - Interpolation at equally spaced points : Forward and Backward differences – Newton's forward and backward difference formulas. Fitting of polynomials and other curve - Least square approximation of functions - linear and polynomial regressions.

Block 4 : Numerical differentiation and Integration : Differentiation based on polynomia fit - Numerical integration using Simpson,s rule and Gaussian quadratic formula - Numerical solution of differential equations of the form dy/dx=f(x,y) using Euler,s method and Runge-Kutta methods.

REFERENCES

1. NUMERICAL METHODS FOR SCIENTIFIC AND ENGINEERING COMPUTATION BY M.K.JAIN, S.R.K.IYENGAR, R.K. JAIN.

2. ELEMENTARY NUMERICAL ANALYSIS BY SAMUEL D.CONTE AND CART DE BOOR, MCGRAW HILL INTERNATIONAL EDITION.

3. NUMERICAL METHODS FOR SCIENCE AND ENGINEERING, PHI BY R.G.STANTON

4. COMPUTER BASED NUMERICAL ALGORITHMS BY E.V.KRISHNAMOORTHY

5. INTRODUCTION TO NUMERICAL ANALYSIS BY E.ATKINSON

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- https://www.youtube.com/watch?v=ffONgckhDyI
- https://www.youtube.com/watch?v=WK8OMc9Egcc
- https://www.youtube.com/watch?v=UTuedji1mXo

COURSE OUTCOMES

COC-1: Critically analyse the Propagated Errors, Recognizing the Pitfalls in Computation. Solution of Non-Linear equations and Convergence criteria of Iterative methods.

COC-2: Interpret the Cramer's Rule and Gauss elimination method and analyse the Comparison of Direct and Iterative methods.

COC-3: Considerate of Newton's forward and backward difference formulas, evaluation of Least square approximation of functions - linear and polynomial regressions.

COC-4: Summarize the Numerical differentiation and Integration, using Euler,s method and Runge-Kutta methods and also Differentiation based on polynomia fit - Numerical integration using Simpson,s rule and Gaussian quadratic formula

MCA 09 C++ and Object Oriented Programming

COURSE OBJECTIVES

CO-1: Explain the Programming Paradigms. Discuss the Overview of C++ with Structure along with I/O Manipulators.
CO-2: Describe the Precedence rules. Scope Resolution with control structure and Initialisation, also describe goto statement and labels

CO-3: Comprehend the Task of Multi-Dimensional arrays. Analyse the Bit fields, Array of structures with Anonymous unions and Pointers.

CO-4: Explain Structured and Object Oriented Programming, Components of Recursive function and Classes,Objects, Evaluation of Exception handling. Discuss Unified Modeling Language

COURSE SYLLABUS

Block-1 : C++ Fundamentals : Object Oriented Programming - Programming Paradigms – Benefits and Concepts – Advanced Concepts – OOP languages – Overview of C++ - Structure of a C++ Program – Header Files - Keywords – Tokens and Identifiers – Compiling – Running C++ programs - Constants and Variables: Data Types – Integer – Float – Char – Double – Pointer – Variable and Constant declarations – Macro definitions – Reference variables – Complex variables – Type conversions – Type casting – Storage classes : auto, register, static, extern - Input and Output: Stream I/O – I/O Manipulators – Creating I/O manipulators – IOS flags – Stream buffer class hierarchy

Block-2 : Programming Constructs : Operators: Arithmetic – Relational – Logical – Assignment – Pre and Post Increment & Decrement – Bitwise – Scope Resolution :: operator – ?(conditional) – Value operator – Member operator – Indirection operator – new and delete operator – Precedence rules – Control structures: if – else – if elseif ladder – switch case - Iterative constructs - Loops – for loop – while loop – do while loop – Initialisation – exit condition – increment/decrement for three loops compared – Nesting loops – Creating infinite loops – break and continue statements – goto statement and labels

Block-3 : Data Structures : Arrays: Single Dimensional arrays - Declaration – Initialization – Multi-Dimensional arrays – Declaration – Initialization – Addressing method – Subscripts –

Character arrays – Initialization – Null Character – Multi-dimensional character arrays – Structures: – Declaration – Definition – Bitfields – Array of structures – Structure containing arrays – Pointer to structures – Structures versus unions – Ananymous unions

Block – 4 : Structured and Object Oriented Programming : Functions: Structured Programming – Function definition & declaration – Parameters – Arguments – Return Values – void – Call by value parameters – Call by reference parameters – Passing arrays – Passing structures – Passing a function to another function – Pointer to function – Recursive function – Classes : and Objects – Visibility Labels – private, public and protected – Data members – Member functions – Object declaration and accessing members – Passing objects to functions – Returning objects – Constructor function – Destructor function – friend functions – static data and function members – Inline functions versus macros – Overloading: Compile-Time Polymorphism – Function overloading – Rules for function overloading – Operator overloading – rules for operator overloading - Function templates – Class templates – Extensibility – Reusability – Inheritance – Run-Time Polymorphism – Virtual functions – Files: fstream header file - text and binary files creation and access – random access in files – storing objects in files – command-line arguments to main() function – Exception handling – Unified Modeling Language (UML) – Context Diagrams

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COURSE OUTCOMES

COC-1: Interpret the Tokens and Identifiers and Storage classes and analyse the Stream buffer class hierarchy along with IOS flags.

COC-2: Considerate of Precedence rules, evaluation of Initialisation, Impact of Loops.

COC-3: Summarize the human problems in automated office, Hardware and software requirements, components of Multimedia and hardware software requirements. Evaluation and selection of a system.

COC-4: Summarize the Arrays, Addressing methodMulti-dimensional character arrays. Evaluation of Ananymous unions.

MCA 10   Theory of Computer Science

COURSE OBJECTIVES

CO-1: Explain the **Set, Relations and Functions** . Discuss the Equivalence Relation Partitions and Equivalence Classes and special type of function.

CO-2: Describe the Tautological ,Truth table of C programming. Replacement Process with Normal forms and Theory of Inference for Propositional and predicate calculus.

CO-3: Comprehend the Representation of FA. Analyse the Techniques for Turing Machine construction along with Context free grammar and Context free language.

CO-4: Explain Graph theory in matrix representation of graphs and also trees.

COURSE SYLLABUS

Block 1 : Set, Relations and Functions : Sets – Notation and description of sets – subsets – operations on sets – Properties of set operations – Relations : Representation of a relation – Operations on Relations – Equivalence Relation Partitions and Equivalence Classes. Functions : Definition – One to one – Onto functions – Special type of functions – Invertible and composition of functions.

Block 2 : Logic : Introduction – Connectives – Statements : Atomic – Compound – Well formed – Truth Table – c – Tautological implications and equivalence of formulae – Replacement Process – Normal forms – Principal Normal forms – Theory of Inference – Quantifiers – Theory of Inference for Propositional and predicate calculus.

Block 3 : Finite Automata and Languages : Definition – Representation of FA – Languages Accepted by FA - Non-deterministic Finite Automata – Regular Sets – Phase structure grammar – Context free grammar – Context free language – Finite Automata and regular languages – Turing Machines – Techniques for Turing Machine construction

Block 4: Graph theory : Basic concepts – definition – paths – reach – ability and connectedness – matrix representation of graphs – trees.

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1. DISCRETE MATHEMATICAL STRUCTURES WITH APPLICATIONS TO COMPUTER SCIENCE BY J.P.TREMBLAY AND R.MANOHAR, MCGRAW HILL.

2. DISCRETE MATHEMATICS BY M.K.VENKATRAMAN, N.SRIDHARAN AND N.CHANDRASEKARAN. NATIONAL PUBLISHING COMPANY, 2000.

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COURSE OUTCOMES

COC-1: Critically analyse the Notation and description of sets. Recognizing the Properties of set operations and Equivalence Relation Partitions and Equivalence Classes.

COC-2: Interpret the Principal Normal forms and Quantifiers and analyse the Phase structure grammar with Finite Automata and regular languages.

COC-3: Summarize the Principal Normal forms, Theory of Inference,Quantifiers, Theory of Inference for Propositional and predicate calculus software requirements,

COC-4: Components of basic and hardware software requirements. Evaluation and selection of a matrix representation of graphs.

SECOND YEAR

MCA 11 Computer Graphics

COURSE OBJECTIVES

CO-1: Explain the Graphics Overview. Discuss the Line Drawing Algorithms and Drawing Ellipse and Circle generation Algorithms.

CO-2: Describe the Two Dimensional Transformations, Matrix Representation. Viewing Transformations and Windows and view ports ,Aspect Ratio along with Clipping and Shielding

CO-3: Comprehend the 3D Transformations. Analyse the Specifying Projection Plane and view volume along with Z-Buffer Algorithm and Depth Comparison.

CO-4: Explain Components of User Interface and the command Language ,Styles of Command Language with Feedback.

COURSE SYLLABUS

Block 1 : Graphics Overview – Applications of Computer Graphics – Video Display Generation – Input Devices – Hard Copy Output Devices – Graphics System Software-Output Primitives : Point Plotting – Line Drawing Algorithms – Equation of a line: DDA – Bresenham's algorithms

– Circle generation Algorithms – Drawing Ellipse – Other Geometric Shapes – Region Filling Techniques

Block 2: 2D Transformations : Introduction - Two Dimensional Transformations: Transformation Principles – Basic Transformation – Matrix Representation – Composite Transformation - Two Dimensional Viewing and Clipping : Viewing Transformations – Windows and view ports – Aspect Ratio – Clipping and Shielding : Point Clipping – Line segment clipping – Convex Polygon clipping – Sutherland Hodgmam Algorithm.

Block 3: 3D Transformations : Concepts – Basic Transformations : Translation, Scaling, Rotation and Mirror Reflection – Matrix Representation – Composite Transformations-Three Dimensional Viewing and Clipping : Viewing Process – Three Dimensional Viewing : Specifying Projection Plane and view volume – Clipping: Clipping against a finite view volume – Cohen Sutherland Algorithm – Constructing a three dimensional view – Hidden Surface Algorithm : Depth Comparison – Z-Buffer Algorithm

Block 4 User Interface Design : Introduction - Components of User Interface – The User's Model – The command Language – Styles of Command Language – Information Display – Feedback – Examples.

REFERENCE BOOKS

1. INTERACTIVE COMPUTER GRAPHICS BY M. NEWMANN AND F. SPROULL, MCGRAW HILL

2. COMPUTER GRAPHICS BY PLASTOK AND GORDON KALLEY, MCGRAW HILL.

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COURSE OUTCOMES

COC-1: Critically analyse the Applications of Computer Graphics. Recognizing the Video Display Generation and Graphics System Software.

COC-2: Interpret the Basic Transformation,Matrix Representation forms and Viewing Transformations along with Sutherland Hodgmam Algorithm.

COC-3: Summarize the Rotation and Mirror Reflection, Constructing a three dimensional view,Quantifiers, Z-Buffer Algorithm.

COC-4: Components of The command Language,Styles of Command Language,Evaluation and selection of a Information Display.

MCA 12 Design and Analysis of Algorithms

COURSE OBJECTIVES

CO-1: Explain the Algorithms and its Development. Discuss the Development of a Model with Design of an Algorithm and Correctness of the Algorithm.

CO-2: Describe the Top-down structured Programming, Matrix Representation. The Knight's Tour, Adjacency Lists with Adjacency Lists and Push-down Lists also along with Probabilistic Model.

CO-3: Comprehend the Algorithm Design Methods. Analyse the Jeep Problem and Backtrack Programming also the Performance Analysis of Straight Insertion Sort.

CO-4: Explain Simulation and Computer Science Algorithms and the Sorting Techniques, discuss the Binary Tree Search.

COURSE SYLLABUS

Block 1 : Introduction to Algorithms and its Development : Introduction - Algorithms – Basic Steps in Development : Statement of the Problem – Development of a Model – Design of an Algorithm – Correctness of the Algorithm – Programme Testing – Documentation

Block 2 : Basic Tools : Top-down structured Programming – Program Correctness – Example : The Knight's Tour – Networks (Graphs): Fundamentals - Representation – Trees – Isomorphism – Linked Lists – Adjacency Lists – Adjacency Lists – Push-down Lists – Queues – Probabilistic Model – Example : Performance Analysis of Straight Insertion Sort.

Block 3 : Algorithm Design Methods : Basic Problem Solving Methods : Sub goal, Hill-Climbing and Working Backward – Example : Jeep Problem -Backtrack Programming : Example; Bicycle Lock Problem – Branch and Bound: Example : Traveling Salesman Problem for five-city network-Recursion : Example : Factorials and Fibonacci Series, Ackermann's Function.

Block 4 : Simulation and Computer Science Algorithms : A single Queue – Single Server Problem – Sorting Techniques : Quick sort - Heap sort - A worst-case O (N log N) Sorting Algorithm – Searching : Binary Search : Average Complexity – Binary Tree Search and Insertion.

REFERENCES

1. INTRODUCTION TO THE DESIGN AND ANALYSIS OF ALGORITHMS BY S.E. GOODMAN AND S.T. HEDETNIEMI.

2. FUNDAMENTALS OF COMPUTER ALGORITHMS BY ELLIS HOROWITZ AND SARTAJ SAHNI, GALGOTIA PUBLICATIONS.

3. ALGORITHMS AND DATA STRUCTURES BY NIKLAUS WIRTH, PHI.

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COURSE OUTCOMES

COC-1: Components of the Algorithms Evaluation and selection of Correctness of the Algorithm and its technique.

COC-2: Critically analyse the Linked Lists with Adjacency lists. Recognizing the Queues with Probabilistic Model also with the Example of Performance Analysis of Straight Insertion Sort.

COC-3: Interpret the Traveling Salesman Problem Representation of Factorials and Fibonacci Series, Ackermann's Function.

COC-4: Summarize the Simulisation and Computer Science Algorithms A worst-case O, also the Binary Tree Search and Insertion.

MCA 13 Accounting and Finance on Computers

COURSE OBJECTIVES

CO-1: Explain the Fundamentals of Accounting. Discuss the Rules of Journalising ,Ledger ,Trial Balance also the Rectification of Errors

CO-2: Describe the Financial Statement, Tools of Analysis,Trend Analysis. Ratio Analysis with its Limitation..

CO-3: Comprehend the Cost elements. Analyse the ABC Analysis and VED Analysis, – Methods of wage payment also the Machine hour rate method.

CO-4: Explain Marginal Costing and the Budgeting, discuss the Management of Working Capital.

COURSE SYLLABUS

Block 1 : Fundamentals of Accounting : Principle of Accounting – Accounting and its Function : Double Entry Book Keeping – Journal – Rules of Journalising – Ledger – Trial Balance – Rectification of Errors – Trading Profit and Loss Account – Balance Sheet.

Block 2 : Financial concepts : Financial Statement – Nature of Financial Statements – Limitations of Financial Statements – Types of Analysis – Tools of Analysis – Trend Analysis – Comparative Statement –: Types of Ratio – Factors affecting efficiency of Ratio – Limitations of Ratio – Fund Flow Analysis – Cash Flow Analysis.

Block 3 : Cost Accounting : Introduction to Costing – Cost elements – Classification of costs – Materials – Stock levels – ABC Analysis – VED Analysis – Labour – Methods of wage payment – Incentive schemes of wage payment : Overheads – absorption of overhead – Machine hour rate method.

Block 4 : Methods of Costing and Budgeting : Marginal Costing – Break even analysis – Application of Marginal Costing – Limitations – Budgeting : Importance of Budgeting – Budget factors – Cash Budget – Sales Budget – Flexible Budget – Management of Working Capital.

REFERENCES

1. ADVANCED ACCOUNTANCY BY R.L.GUPTA, AND M.RADHASAMY, SULTAN CHANT & SONS.

2. PRINCIPLES OF MANAGEMENT ACCOUNTING BY MAN MOHAN AND GOYAL.

3. STUDIES IN COST ACCOUNTING BY P. DAS GUPTA, PREMIER BOOK COMPANY.

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COURSE OUTCOMES

COC-1: Components of the Algorithms Evaluation and selection of Correctness of the Algorithm and its technique.

COC-2: Critically analyse the Nature of Financial Statements with Types of Analysis ,Tools of Analysis, Trend Analysis with Comparative Statement and Types of Ratio along with Factors affecting efficiency of Ratio.

COC-3: Interpret the Classification of costs Overheads and absorption of overhead along with Machine hour rate method.

COC-4: Summarize the Application of Marginal Costing and Computer Science Algorithms A worst-case O, also the Binary Tree Search and Insertion.

MCA 14 Communication Skills
COURSE OBJECTIVES

CO-1: Explain the Faster reading its techniques. Discuss the Articles writing along with Improving English language writing technique.

CO-2: Describe the Art of conversation, Brain Storming Analysis, Presenting reports with its Techniques.

CO-3: Comprehend the Mock Interview Art of Guiding and Controlling Discussion and Personality test through Group discussion with Mock Group Discussion.

CO-4: Desirable body language and Body language as a powerful communication. discuss the Mock Negotiation-Meetings.

COURSE SYLLABUS

Block 1 : .Communication: Concepts and definition – Importance – Process communication – Model – Types – Mode of communication – Objectives – Inter, Intra personal communication – Barriers – Commandments of communication-Developing communication skills : Reading : Preparation – Reading Styles – Linear reading – Faster reading – Reading techniques – Writing : Effective writing – Report writing – Speech writing – Minutes and communication aids – Agenda writing – Letters – Articles writing – Improving English language writing – When to write and when not to write Listening and

Block 2 : Speaking and Listening: Importance – Art of Listening – Advantages – Mode of Expression – Listening tests – Speaking : Art of conversation – Using telephone – Methods of asking questions – Brain Storming – Presenting reports – Improving Speech delivery – Expressing Techniques

Block 3 : Interview Techniques : What and Why? – Types of Interviews – Understanding the intricacies – Planning for interview – Answering Skills – Effective Communication during Interview – IPS – Mock Interview. Group Discussion : Purpose – Process of Group Discussion – Presentation – Getting Started – Art of Guiding and Controlling Discussion – Personality test through Group discussion – Lateral thinking – Participation Techniques – Mock Group Discussion.

Block 4 : Body Language : Origin and development of body language – Tool for Personality identification – Analysis of body language – Types – Desirable body language – Attitude and body language – Body language as a powerful communication-Negotiation Techniques : Meaning – Importance – Fundamentals – Preparation – Techniques for negotiation – Managing process of negotiation – Interpersonal behaviour – Mock Negotiation-Meetings : Meaning – Importance – Objectives – Leading and participating in meetings – Communication skills for meetings – Mock Meetings – Seminars.

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1. ADVANCED ACCOUNTANCY BY R.L.GUPTA, AND M.RADHASAMY, SULTAN CHANT & SONS.

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COURSE OUTCOMES

COC-1: Components of the Reading Styles, Linear reading, Faster reading along with Effective writing,Report writing, Speech writing

COC-2: Critically analyse the Art of Listening with advantages along with Improving Speech delivery.

COC-3: Interpret the Classification of costs Overheads and absorption of overhead along with Machine hour rate method.

COC-4: Summarize the Techniques for negotiation and Interpersonal behaviour, Communication skills for meetings, Mock Meetings, Seminars.

MCA 15 Computer Networks

COURSE OBJECTIVES

CO-1: Explain the Uses of Computer Networks. Discuss the Network Standardisation-Physical Layer: Transmission Media – Telephone System

CO-2: Describe the Design Issues, ALOHA, Carrier Sense Multiple Access Protocols , Collision Free Protocols.

CO-3: Comprehend the Routing Algorithms ,Congestion Control Algorithms ,internetworking: Tunneling, Fragmentation with Network Layer in the Internet.

CO-4: Explain Desirable body language and Body language as a powerful communication. discuss the Mock Negotiation-Meetings.

COURSE SYLLABUS

Block 1 : Introduction: Uses of Computer Networks – Network Hardware and Network Software – Reference Models – Example Networks – Network Standardisation-Physical Layer: Transmission Media – Telephone System – ISDN – Broadband and Narrowband ISDN – ISDN and ATM – Communication Satellites.

Block 2 : Data Link Layer: Design Issues – Error Detection and Correcting Codes – Elementary Data link Protocols – Sliding Window Protocols – Protocol Specification and Verification: Finite State Models – Petri Net Models – Example D-link Protocol: HDLC – SLIP – PPP – Media Access Sub layer: Multiple Access Protocols – ALOHA – Carrier Sense Multiple Access Protocols – Collision Free Protocols.

Block 3 : Network Layer: Design Issues – Routing Algorithms – Congestion Control Algorithms – internetworking: Tunneling – Fragmentation – Firewalls – Network Layer in the Interne – IP – Subnets – Internet Multicasting – Network Layer in ATM Networks: Cell Format – Connection Setup – Routing and Switching – Services Categories – ATM LANs.

Block 4 : Transport Layer and Application Layer : Transport Service – Element of Transport Protocols: Addressing – Flow Control and Buffering – Multiplexing – Crash Recovery – Performance Issues – Measuring Network Performance – Internet Transport Protocols – TCP – UDP – Protocol for Gigabit Networks-Application Layer: Network Security – Cryptography – Secret and Public Key Algorithms – DNS – SNMP – Electronic Mail – Electronic Mail Privacy – World Wide Web: Client Side – Server Side – Multimedia – Audio – Video – Data Compression – JPEG, MPEG Standards.

REFERENCE BOOKS

1. ADVANCED ACCOUNTANCY BY R.L.GUPTA, AND M.RADHASAMY, SULTAN CHANT & SONS.

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COURSE OUTCOMES

COC-1: Components of the Network Standardisation, Physical Layer: Transmission Media Telephone System, Broadband and Narrowband ISDN and ATM – Communication Satellites.

COC-2: Critically analyse the Art of Design Issues with Error Detection and Correcting Codes – Elementary Data link Protocols.

COC-3: Interpret the internetworking Tunneling, Fragmentation and Routing and Switching along with Services Categories.

COC-4: Summarize the Element of Transport Protocols DNS, SNMP, Electronic Mail – Electronic Mail Privacy along with World Wide Web: Client Side

MCA 16 Operations Research

COURSE OBJECTIVES

CO-1: Explain the Linear Programming and Applications : Graphical and Simplex Method – Transportation Problem

CO-2: Describe the Programming Techniques : Goal Programming,Integer Programming, Dynamic Programming along with Non-Linear Programming

CO-3: Comprehend the Inventory and Waiting Line Models : Inventory Control-Deterministic and Probabilistic Models with Queuing Models.

CO-4:Explain Game Theory with Simulation-Case Studies ,Insulator India Limited and Use of Operations Research Techniques:.

COURSE SYLLABUS

Block 1 : Operations Research Basic Concepts : Introduction – Review of Probability and Statistics-Programming Techniques-Linear Programming and Applications : Graphical and Simplex Method – Transportation Problem – Assignment Problem.

Block 2 : Programming Techniques : Goal Programming – Integer Programming – Dynamic Programming – Non-Linear Programming.

Block 3 : Inventory and Waiting Line Models : Inventory Control-Deterministic and Probabilistic Models – Queuing Models.

Block 4 : Game Theory and Simulation : Competitive Situation: Game Theory – Simulation-Case Studies : Insulator India Limited – Use of Operations Research Techniques: ECS Corporation.

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COURSE OUTCOMES

COC-1: Components of the Review of Probability and Statistics-, Programming Techniques-with Linear Programming and Applications .

COC-2: Critically analyse the Programming Techniques with Dynamic Programming – Non-Linear Programming.

COC-3: Interpret the Inventory Control-Deterministic and Probabilistic Models with Queuing Models.

COC-4: Summarize the Game Theory and Simulation, Use of Operations Research Techniques, ECS Corporation.

MCA 17 Operating Systems

COURSE OBJECTIVES

CO-1: Explain the Fundamentals of Operating System, Mutual exclusion, Semaphores,Event counters, Monitors ,Message Passing.

CO-2: Describe the Process Management Goal , Round robin scheduling Programming, Device-independent I/O Software with Deadlock prevention.

CO-3: Comprehend the Inventory and Waiting Line Models : Inventory Control-Deterministic and Probabilistic Models with Queuing Models.

CO-4: Explain Memory management without swapping or paging,Multiprogramming without swapping or paging and also Multiprogramming and Memory usage.

COURSE SYLLABUS

Block 1 : Fundamentals of Operating System : Introduction: What is an operating system – History of operating systems – Operating system concepts – System calls – Operating system structure-Process Management: Introduction to processes – Inter-process Communication: Race conditions – Critical sections – Mutual exclusion – Semaphores – Event counters – Monitors – Message Passing.

Block 2 : Process Management : Introduction - Round robin scheduling – Priority Scheduling – Multiple queues – Shortest job first – Policy driven scheduling – Two level scheduling-Input / Output Management: I/O Devices – Device Controllers – Goals of I/O Software – Interrupt handlers – Device drivers – Device-independent I/O Software – User-space I/O Software – Deadlocks: Resources – Deadlock modeling – Detection and Recovery – Deadlock Prevention – Avoidance.

Block 3 : Memory Management: Memory management without swapping or paging: Multiprogramming without swapping or paging – Multiprogramming and Memory usage – Multiprogramming with fixed partitions – Swapping: Multiprogramming with variable partitions – Memory management with Bit-maps, Linked-lists and Buddy System – Analysis of Swapping Systems – Virtual Memory: Paging – Segmentation – Page replacement algorithms.

Block 4 : File Management : File basics – Directories – Disk space management – File storage – Directory structure – Shared file – File system reliability – File system Performance – File servers – Security – Protection mechanisms – Case Study Window NT, UNIX.

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1. OPERATING SYSTEM CONCEPTS BY SILBERSCHATZ AND GALVIN, ADDISON WESLEY

2. OPERATING SYSTEM DESIGN AND IMPLEMENTATION BY ANDREW S. TANENBAUM – PHI

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COURSE OUTCOMES

COC-1: Components of the Fundamentals of Operating System with Introduction and History of operating systems , Semaphores and Event counters.

COC-2: Critically analyse the Shortest job first ,Policy driven scheduling ,Two level scheduling-Input / Output Management: I/O Devices

COC-3: Interpret Multiprogramming with fixed partitions, Linked lists and Buddy System Analysis of Swapping Systems ,Virtual Memory: Paging – Segmentation – Page replacement algorithms

COC-4: Summarize the File basics with File system reliability, File system Performance, File servers along with Security ,Protection mechanisms

MCA 18 Object Oriented Analysis and Design

COURSE OBJECTIVES

CO-1: Explain the Evolution of the Object Model with Elements of the Object Model and Applying Object Model, Classes and Objects

CO-2: Describe the Object Oriented Analysis with Classical Approaches and Behavioral Analysis , Domain Analysis and Use Case Analysis

CO-3: Comprehend the Construction- Refactoring with Patterns Refactoring its Transmission, Interactive Development and Pragmatics.

CO-4: Explain Game Theory with Simulation-Case Studies ,Insulator India Limited and Use of Operations Research Techniques:.

COURSE SYLLABUS

Block 1 : The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying Object Model, Classes and Objects: The nature of an Object – Relationships among objects-Classes and Objects: The nature of the class – Relationship among classes – The Interplay of classes and Objects - On building quality classes.

Block 2 : Classification of Classes : Importance of Proper Classification– Identifying classes and objects : Classical and Modern Approaches – Object Oriented Analysis: Classical Approaches – Behavioral Analysis – Domain Analysis – Use Case Analysis – CRC cards – Structured Analysis – Key abstraction mechanisms

Block 3 : Object Oriented Design and development : Design Concepts – Development Process: Micro Development Process – Macro Development Process : Inception – Elaboration – Construction- Refactoring – Patterns – Transmission – Interactive Development – Pragmatics.

Block 4 : UML Diagrams : UML concepts – Diagrams : Use Cases - Class Diagram – Object diagram - Interaction Diagram – Package Diagram – State Diagram – Activity Diagram – Deployment Diagram – Programming using UML.

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1. OBJECT ORIENTED ANALYSIS AND DESIGN BY GRADY BOOCH, ADDISON WESLEY

2. UML DISTILLED BY MARTIN FOWLER, KENDALL SCOTT, ADDISON WESLEY

3. OBJECT ORIENTED SYSTEM DEVELOPMENT BY ALI BAHRAMI.

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COURSE OUTCOMES

COC-1: Components of the Evolution of the Object Model with its Elements of the Object Model and Applying Object Model, Classes and Objects.

COC-2: Critically analyse the Classification of Classes Issues with Error Detection and Correcting Codes Domain Analysis by Use Case Analysis and CRC cards.

COC-3: Interpret the Micro Development Process and Macro Development Process and Interactive Development with Pragmatics.

COC-4: Summarize the UML concepts State Diagram with Activity Diagram and Deployment Diagram with Programming using UML.

MCA 19 Internet Programming

COURSE OBJECTIVES

CO-1: Explain the Foundations for Internet Programming with security and encryption and Intranet application.

CO-2: Describe the Markup language SGML,HTML Character, Text, Block level tags ,Structure of Web pages along with Cascading Style Sheets .

CO-3: Comprehend the Internet Programming Languages , Applets, CGI,PERLMicrosoft Internet Implementation with Internet Scripting Languages: JavaScript.

CO-4: Explain Web Graphics by Adding Graphics to Web Pages with Site and Page Design – and Framing your Graphics with Dynamic Graphics , Animation.

COURSE SYLLABUS

Block 1: Foundations for Internet Programming: An overview of Internet Programming – WWW Design Issues – Security and Encryption – Developing Intranet Applications.

Block 2 : Markup Languages : Introduction - SGML – HTML – Character, Text, Block level tags – Structure of Web pages – Cascading Style Sheets – Frames – Layers – Forms – Internet Explorer – Netscape Navigator.

Block 3 : Internet Programming Languages: Java in Windows – Java Virtual Machine (JVM) - Java Classes – Java Application Program Interface (API) - Applets - CGI – PERL – Microsoft Internet Implementation-Internet Scripting Languages: JavaScript – VBScript – Other Scripting Languages.

Block 4: Multimedia content in Web : Shock wave and Lingo - Active X controls: Creating an ActiveX control to Activate a Web Page – VDO live Technology – Creating Netscape Navigator Plug-Ins – Pulling Web Information – Creating a Custom Integrated Application with Multiple Protocols - Web Graphics: A Graphic View of Web – Easy Web Graphics – Images and Hyperlinks – Adding Graphics to Web Pages – Site and Page Design – Framing your Graphics – Dynamic Graphics – Animation.

REFERENCES

1. WEB PROGRAMMING UNLEASED BY BOB BREEDLOVE ET.AL, SAMS.NET PUBLISHING.

2. WEB GRAPHICS BIBLE BY RON WODASKI, COMDEX COMPUTER PUBLISHING.

3. INTERNET MILLENIUM EDITION, COMPLETE REFERENCE BY YOUNG, TMH.

4. HTML THE COMPLETE REFERENCE BY POWELL, TMH.

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COURSE OUTCOMES

COC-1: Critically analyse the Markup language SGML,HTML Character, Text, Block level tags ,Structure of Web pages along with Cascading Style Sheets.

COC-2: Components of the Foundations for Internet Programming with security and encryption and Intranet application.

COC-3: Interpret Internet Programming Languages , Applets, CGI,PERLMicrosoft Internet Implementation with Internet Scripting Languages: JavaScript.

COC-4: Summarize the Web Graphics by Adding Graphics to Web Pages with Site and Page Design –and Framing your Graphics with Dynamic Graphics with Animation. On Client Side

MCA 20 Visual Programming

COURSE OBJECTIVES

CO-1: Explain the   Windows Programming by Traditional Programming Paradigms   its Overview of Windows Programming along with Data Types , Resources , Windows Messages, Document Interfaces – Dynamic Linking libraries.

CO-2: Describe the Visual Basic Programming: Introduction its Forms Variables, Types – Properties with Decision Making and Looping Modules.

CO-3: Comprehend the Menus , Dialog Boxes , Importing VBX Controls with Files and MFC File Handling also Document View Architecture

CO-4: Explain Exception Handlin, Debugging ,Object Linking and Embedding (OLE) – Database Application, DLL- ODBC.

COURSE SYLLABUS

Block 1: Windows Programming: Traditional Programming Paradigms – Overview of Windows Programming – Data Types – Resources – Windows Messages – Device Contexts – Document Interfaces – Dynamic Linking Libraries – Software Development Kit (SDK) Tools – Context Help.

Block 2: Visual Basic Programming: Introduction – Forms – Variables, Types – Properties – Decision Making – Looping – Modules – Procedures – Functions-Tool Box Controls – Menus – Grid Controls – Dialog Boxes – Database Manager – Data Control – Record set Objects.

Block 3: Visual C++ Programming: Objects – Classes - VC++ Components – Resources – Event Handling – Menus – Dialog Boxes – Importing VBX Controls – Files – MFC File Handling – Document View Architecture – Serialization

Block 4: Interfacing Other Applications – Multiple Document Interface (MDI) – Splitter Windows – Exception Handling – Debugging – Object Linking and Embedding (OLE) – Database Application – DLL – ODBC.

REFERENCES

1. WINDOWS PROGRAMMING BY CHARLES PETZOLD, MICROSOFT PRESS.

2. VISUAL BASIC 6 FROM THE GROUND UP BY GARRY CORNELL, TMH.

3. VISUAL C++ PROGRAMMING BY STEVEN HOLZNER, PHI.

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COURSE OUTCOMES

COC-1: Critically analyse the Visual Basic Programming: Introduction its Forms – Variables, Types – Properties – Decision Making.

COC-2: Components of the Traditional Programming, Windows Messages ,Document Interfaces – Dynamic Linking libraries.

COC-3: Interpret the Menus , Dialog Boxes , Importing VBX Controls with Files and MFC File Handling also Document View Architecture.

COC-4: Summarize the Exception Handling, Debugging ,Object Linking and Embedding (OLE) – Database Application, DLL- ODBC.

THIRD YEAR

MCA 21 Relational Database Management System

COURSE OBJECTIVES

CO-1: Explain the Database Management System.Discuss Concepts of Relational Model with Comments on the Relational Model .

CO-2: Describe the Types of Databases, CPU - Network System Tables - Oracle Users - Logical Structures.

CO-3: Comprehend the Elements of SQL Language. Analyse the Basic Query, Using Expressions, Working with NULL values, Joining Multiple Tables in a Query

CO-4: Explain Modifying Tables , Renaming a Table , Copying another table ,Dropping a Table – Other Database Objects

COURSE SYLLABUS

Block 1 : Database Management System : Database – Database Management System – Features – Advantages – Database Scheme – Schema and subschema – Manipulative capabilities – Guidelines – Different User Interfaces-Relational Model : Concepts of Relational Model – Comments on the Relational Model : Semantic issues, Navigation, Efficiency – DBMS based on the Relational Model : The mapping operation – Data manipulation facilities – Data Definition facilities – Data Control facilities

Block 2: Introduction to Oracle: Types of Databases - Relational Database properties - Benefits of Oracle - Client/ Server systems – Oracle Database Architecture: Overview of Oracle Architecture – Process - Physical files – CPU - Network System Tables - Oracle Users - Logical Structures.

Block 3: Oracle Database Fundamentals: Elements of SQL Language: Database Objects, Data Access SQL Commands, DML Commands – Oracle Queries – Basic Query, Using Expressions, Working with NULL values, Joining Multiple Tables in a Query, Selecting Distinct Values, Using Sub queries, Unions and Multiple part Queries-

Block 4 : Table Handling and Embedded SQL : Table Creation : Create table statement - Privileges required - Describing Table Definitions - Modifying Tables - Renaming a Table - Copying another table - Dropping a Table – Other Database Objects - Reason for Database

Objects - Indexes – Embedded SQL : Languages supported by Oracle Precompiler - Embedded SQL : Languages supported by Oracle Precompiler, Embedded SQL statements.

REFERENCE BOOKS

1. AN INTRODUCTION TO DATABASE SYSTEM BY C.J.DATE, ADDISON WESLEY.

2. DATABASE SYSTEM CONCEPTS BY SILBERSCHATZ, KORTH AND SUDARSHAN, MCGRAW HILL.

3. AN INTRODUCTION TO DATABASE SYSTEMS BY BIPIN C.DESAI, GALGOTIA PUBLICATIONS.

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- https://mrcet.com/downloads/digital_notes/ECE/III%20Year/DATABASE%20MANAGEMENT%20SYSTEMS.pdf

COURSE OUTCOMES

COC-1: Critically analyse the Semantic issues, Navigation, Efficiency of DBMS based on the Relational Model The mapping operation with Data manipulation facilities

COC-2: Interpret the Relational Database properties and ,Benefits of Oracle ,Client/Server systems.

COC-3: Summarize the DML Commands , Oracle Queries – Basic Query, Using Expressions, Working with NULL values, Joining Multiple Tables in a Query, Selecting Distinct.

COC-4: Components of Embedded SQL, Languages supported by Oracle Precompiler - Embedded SQL : Languages supported by Oracle command Language.

MCA 22 Client Server Technologies

COURSE OBJECTIVES

CO-1: Explain the client / server computing.Discuss the Centric client / server computing and Investment through porting along with its Advantages.

CO-2: Describe the Components of client / server application, RPC, windows services, Fax / print services, Remote boot services RPC, windows services, Fax / print services, Remote boot services

CO-3: Comprehend the System Application architecture (SAA). Analyse the Open systems interconnect (OSI) process communication (IPC).

CO-4: Explain Components of **:** Client / server development software, Distributed Objects and Internet

COURSE SYLLABUS

Block 1 : Client Server Computing Concepts : Introduction to client / server computing – Main frame – Centric client / server computing – Downsizing and client / server computing – Preserving mainframe application – Investment through porting – Client / server development tools – Advantages of Client / Server computing.

Block 2 : Components of Client Server Environment : Client Component : Components of client / server application – The client – Client service, request for services, RPC, windows services, Fax / print services, Remote boot services, other remote services – Utility embedding – Common request broker architecture (CORBA) – Server Component: The server - Detailed server functionality – The networking operating system – Novell network – LAN manager – IBM LAN server – Banyan VINES-PC network file services.

Block 3 : Client Server Platforms : Server operating system : Netware, OS/2,Windows NT, Unix – System Application architecture (SAA) – Connectivity – Open systems interconnect (OSI) process communication (IPC) – Communication interface technology – Wide area network technology.

Block 4 : Client / server development software – Platform migration and reengineering of existing systems – Hardware components - Distributed Objects and Internet: Distributed objects and components – Compound documents : The client framework – OLE / DCOM – Client / server and the Internet – Application Development Tools : Workbench architecture – Information engineering facility architecture – EASEL Workbench – Ellipse – SQL windows – Power builder – SQL Tool set – APT workbench component.

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1. CLIENT SERVER COMPUTING BY DEWIRE AND DAWNA TRAVIS, MCGRAW HILL.

2. DESIGNING ENTERPRISE CLIENT/SERVER SYSTEMS BY BETH GOLD – BERNSTEIN, DAVID MARCA PHI.

3. CLIENT / SERVER COMMUNICATIONS BY THOMAS S LIGON, TMH.

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COURSE OUTCOMES:

COC-1: Critically analyse the Common request broker architecture. Recognizing the Client / server development tools with its advantages.

COC-2: Interpret the Basic Transformation, Matrix Representation forms and Viewing Transformations along with Sutherland Hodgmam Algorithm.

COC-3: Summarize the Netware. EASEL Workbench, Constructing a Open systems interconnect (OSI) process communication.

COC-4: Components of The client framework OLE / DCOM, Ellipse SQL windows analysis Power builder with SQL Tool set and APT workbench component.

MCA 23 Multimedia Systems

COURSE OBJECTIVES

CO-1: Explain the Multimedia definition and its Need. Discuss the Multimedia platforms , Development tools and its Types.

CO-2: Describe the Redundancy6 and visibility,Video compression techniques, Evaluating a compression system. Viewing Transformations and Windows and view ports ,Aspect Ratio along with Clipping and Shielding

CO-3: Comprehend the 3D Transformations. Analyse the Specifying Projection Plane and view volume along with Z-Buffer Algorithm and Depth Comparison.

CO-4: Explain CD family, CD-i its Overview,Media,Types,Multimedia on Networks also the Training and Education

COURSE SYLLABUS

Block 1: Basic Concepts of Multimedia : Introducing Multimedia – Multimedia definition – Need, benefits and problems – System components – Multimedia platforms – Development tools: Type – Cross platform compatibility – Commercial tools – Standards

Block 2: Media types : Non temporal – Text, image, graphics – Temporal – Analog, digital, audio / video, music, animation, other media types – Extended images, digital link, speech audio-Digital video and Image compression : Evaluating a compression system – Redundancy6 and visibility – Video compression techniques – Image Compression Standards – JPEG, MPEG, DVI.

Block 3: Object Oriented Multimedia: Object, Classes and related items – Multimedia Frameworks: Overview - Media classes - Transform classes format classes - component classes

Block 4 : Multimedia Environments: The CD family, CD-i – Overview – Media Types – Media Organization – Architecture and Operations – Applications: Media in real world – Multimedia and single user – Multimedia on Networks – Training and Education.

REFERENCE BOOKS

1. MULTIMEDIA IN PRACTICAL TECHNOLOGY AND APPLICATION BY JUDITH JEFFCOATE, PHI.

2. MULTIMEDIA PROGRAMMING BY SIMON J.GIBBS AND DIONYSION C TSICHRIKZIS, ADDISON WESLEY.

3. MULTIMEDIA SYSTEMS BY JOHN F. KOEGEL BUFORD, ADDISON WESLEY.

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COURSE OUTCOMES

COC-1: Critically analyse the System components and Multimedia platforms. Recognizing the Development tools: Type , Cross platform compatibility and Commercial tools with Standards.

COC-2: Interpret the image, graphics with other media types ,Extended images, digital link, Video compression techniques and Viewing Transformations along with JPEG, MPEG, DVI.

COC-3: Summarize the Object, Classes and related items,Components of Transform classes format classes - component classes

COC-4: Evaluation and selection of a Multimedia Environments.also Architecture and Operations

MCA 24 Distributed Computing

COURSE OBJECTIVES

CO-1: Explain the Distributed Processing.Discuss the Hardware Concepts and Switched Multiprocessor along with Time Distributed System.

CO-2: Describe the Buffered Versus Unbuffered primitives, Implementation of Client/Server model. The Client/Server Model and its Implementation.

CO-3: Comprehend the Clock Synchronization in distributed systems, Electron algorithms. Analyse the Dead lock distributed system and view Processor allocation.

CO-4: Explain Components of Distributed DBMS Architecture and Updating distributed data – Distributed transaction management

COURSE SYLLABUS

Block 1 : Distributed Processing : Introduction – Distributed computing Models – Load Balancing – RPC – Process Migration - Hardware Concepts – Switched Multiprocessor – Bus based multi computers – Switched Multi computers – Software Concepts – Network Operating System and NFS – Time Distributed System. Design Issues: Transparency – Flexibility – Reliability – performance and Scalability.

Block 2 : Communications in distributed system : The Client/Server Model – Blocking versus Non Blocking Primitives – Buffered Versus Unbuffered primitives – Implementation of Client/Server model.

Block 3: Synchronization in distributed system : Clock Synchronization in distributed systems – Clock Synchronization – Multi exclusion – Electron algorithms – Atomic transaction – Dead lock distributed system – Thread usage an implementation of thread packages – Processor allocation.

Block 4: Distributed File System : File Service interface – Semantics of file sharing – Distributed file system Implementation of new trends in distributed file system. Distributed databases : Distributed DBMS Architecture – Storing Data in a Distributed DBMS – Distributed DBMS – Distributed catalog Management – Distributed query processing – Updating distributed data – Distributed transaction management – Distributed Concurrency control – Recovery.

REFERENCE BOOKS

1. ADVANCED CONCEPTS IN OPERATING SYSTEM BY MUKESH SINGAL AND SHIVARATRI N.G., MCGRAW HILL.

2. MODERN OPERATING SYSTEM BY TANENBAUM A.S, PHI.

3. DISTRIBUTED OPERATING SYSTEMS – CONCEPTS AND DESIGN BY PRADEEP K.SINHA, PHI.

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COURSE OUTCOMES

COC-1: Critically analyse the Applications of Computer Graphics. Recognizing the Video Display Generation and Graphics System Software.

COC-2: Interpret the Client/Server Model, Blocking versus Non Blocking Primitives and Implementation of Client/Server model.

COC-3: Summarize the Multi exclusion, Constructing Electron algorithms, Thread usage an implementation of thread packages, Processor allocation.

COC-4: Components of The command Language,Styles of Command Language,Evaluation and selection of a Information Display.

MCA 25 Network Programming

COURSE OBJECTIVES

CO-1: Explain the Overview of Active X Scripting. Discuss the Java Scripting,Stand-Alone Scripts ,Active X Controls and Creating Active X Controls

CO-2: Describe the Active X Document Architecture, Creating Active X Documents.

CO-3: Comprehend the URL Monickers. Analyse the Hyperlink Interface with Working with URL Monickers ,ISAPI its Extension and Filter.

CO-4: Explain IIS Applications and the Active X Documents, Modifying Code, Launching and Testing Document also Testing the DLL.

COURSE SYLLABUS

Block 1: Active X Scripting : Overview of Active X Scripting – Java Scripting – Stand-Alone Scripts – Active X Controls – Creating Active X Controls.

Block 2: Active X Documents : - Introduction – Active X Document Architecture – Creating Active X Documents

Block 3: URL Monickers – Hyper linking – Hyperlink Interface – Working with URL Monickers - Overview of ISAPI – ISPAI Extension – ISAPI Filter

Block 4: Designing IIS Applications – Building IIS Applications – Building Data Driven-DHTML Applications - Active X Documents – Technology – Migration Wizard – Modifying Code – Launching and Testing Document – Testing the DLL.

REFERENCE BOOKS

1. VISUAL C++ FROM GROUND UP BY JOHN PAUL MULLER, TMH.

2. VISUAL BASIC 6 COMPLETE REFERENCE BY NOEL JERKE, TMH.

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COURSE OUTCOMES

COC-1: Critically analyse the Active X Scripting. Recognizing the Java Scripting,Stand-Alone Scripts ,Active X Controls ,Creating Active X Controls.

COC-2: Interpret the Active X Document Architecture, Creating Active X Documents

COC-3: Summarize the ISPAI Extension and Filter with , URL Monickers and Hyper linking Interface.

COC-4: Components of Active X Documents, Technology ,Migration Wizard by Modifying Code Launching and Testing Document also Testing the DLL.

PROGRAMME OUTCOMES

PO1: Induce the self analyzing capability through critical thinking in order to address real time computing challenges.

PO2: Identify, deep drive analyze, interpret and to formulate complex solutions using to various computing domains.

PO3: Transform complex computing tasks into solvable parts of problem, investigate, develop solutions and propose integrated solutions using emerging technologies.

PO4: Choose modern computing tools, skills and techniques necessary for software solutions.

PO5: Understand, develop and apply professional ethics and cyber guidelines as suitable to commercial environments.

Mapping of curriculum for Master of Computer Applications

	MCA-01	MCA-02	MCA-03	MCA-04	MCA-05	MCA-06	MCA-07	MCA-08	MCA-09	MCA-10	MCA-11	MCA-12	MCA-13	MCA-14	MCA-15	MCA-16	MCA-17	MCA-18	MCA-19	MCA-20	MCA-21	MCA-22	MCA-23	MCA-24	MCA-25
Fundamental understanding of the field	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Application of basic computing concepts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Linkages with related disciplines	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Skills in related field of specialization	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓											
Ability to use in Real time problem	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-											✓
Skills in Design / Solution modeling	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-											
Skills in analysis and interpretation of data	-	-	-	-	✓	-	-	✓	-	-	✓	-	-	-										✓	✓
Develop investigative Skills	-	-	-	✓	-	-	-	✓	-	-	-	✓	-	-										✓	
Skills in problem solving	-	-	✓	-	✓	-	-	-	✓	-	-	-	-	-											✓
Develop Technical Communication skills	-	-	-	-	-	✓	-	-	✓	-	-	-	-	✓									✓		✓