Course Plan for MCA Programme

Semester – I

Paper code	Subject Name	Lectures Per Week	Scheme of Examination Maximum Marks		
			Written	Sessional	Total
S-1.1	Information Technology	3	80	20	100
S-1.2	Programming & Data Structures With 'C'	3	80	20	100
S-1.3	Fundamentals of Management	3	80	20	100
S-1.4	Information Systems	3	80	20	100
S-1.5	IT & Programming LAB (MS-Word, MS-Excel, MS-PowerPoint, 'C')	6			100
Semester – II					
S-2.1	Object Oriented Programming with C++	3	80	20	100
S-2.2	Operating Systems	3	80	20	100
S-2.3	Discrete Mathematics	3	80	20	100
S-2.4	Principal of Accounting	3	80	20	100
S-2.5	Unix & C++ Lab	6			100
Semester – III					
S-3.1	Database Management System	3	80	20	100
S-3.2	Computer Communication Network	3	80	20	100
S-3.3	IT-Elective – I	3	80	20	100
S-3.4	Environment Management	3	80	20	100
S-3.5	Oracle & Elective Lab	6			100
Semester – IV					
S-4.1	Visual Programming with Visual Basic	3	80	20	100
S-4.2	Software Engineering	3	80	20	100
S-4.3	Optimization Techniques	3	80	20	100
S-4.4	IT Elecitve-II	3	80	20	100
S-4.5	Visual Basic, MS-Project/Designer 2000 MS-Access Lab	6			100
Semester – V					
S-5.1	Internet and Web Designing	3	80	20	100
S-5.2	Computer System Architecture	3	80	20	100
S-5.3	IT Elective –III	3	80	20	100
S-5.4	BM Elective-II	3	80	20	100
S-5.5	Organizational Behaviour	3	80	20	100
S-5.6	Internet & Web Designing, Elective Lab	6			100
Semester – VI					
S-6.1	Seminar				100
S-6.2	Project				400

SYLLABUS OF M.C.A.

Semester: I

S-1.1 INFORMATION TECHNOLOGY:

Information Concept and Processing: Evaluation of Information, Processing Data and information Languages and Communication, Data Processing System

Elements of Computer Processing System: Hardware –CPU, Storage Device and media, VDU, Input /Out device, Printers, Multimedia System, Data Communication equipment, Software System Software, Application Software.

Programming Languages: Classification, Machine Code, Assembly Language, Higher Level languages, and fourth generation languages, Data representation System – ASCII, BCD, EBCDIC and ISCII, Number System- Binary, Decimal, Octal, Hexadecimal System

Operating System: Concept as resource manager and coordinator of Processor, device and memory, Concept priorities, Protection and Parallelism. Command Interpreter, typical Commands of DOS, Graphical user interface- Window.

Computer and Communication: Single User, Multi-User, and Workstation, Client-server System, Computer Network, Protocols, LAN, WAN, Internet facilities through WWW, Mosaic Gopher, Email, File Transfer, Voice / Video Conferencing

Range of Application: Scientific, Business, Educational, Industrial, National Level weather Forecasting, remote sensing, Planning and multilingual applications

Reference:

1. Rajaraman V. " Fundamental of Computers" (2nd. Edition), Prentic Hall of India
2. Sanders D.H. " Computer Today" McGrav Hill
3. Sinha, P.k. - " Fundamental of Computers" (3rd . Edition),BPBublication

S-1.2 Programming and Data Structure with "C"

Introduction to algorithms Flow Charts, Tracing Flow Charts, Decision Tables, Decision Trees, Pseudo Codes, Problem Solving Methods, Need for Computer Languages, Reading Programs written in C language, C character set, Identifiers and keywords, Data Types, Declarations, Expressions, Statements and Symbolic Constants, Input-Output: getchar, putchar, scanf, printf, gets, puts, functions, Pre-Processor command: #include, define, ifdef, Preparing and running a complete C Program.

Operators and expressions: Arithmetic, Unary, Logical, Bit-Wise, Assignments and Conditional Operators, Library Function, Control Statements: While, Do-While, for Statements, nested loops, if – else, Switch, Break, Continue and goto Statements, Comma operator.

Functions: Defining and accessing: Passing Arguments, Function Prototypes, recursion, use of Library functions, Storage Classes: Automatic external and Static Variables, Arrays: Defining and Processing, Passing to a function, Multi Dimensional Arrays. String, Operations on Strings.

Pointers: Declarations, Passing to a function, Operations on Pointer and Arrays, Arrays of Pointers.

Structures: Defining and Processing, Passing to a function, Unions.

Data Files: Open, Close, Create, Process, Unformatted Data Files.

Data Structures: Stacks, QUEUES< Lists, Trees, and their Application.

References:

1. Hutchison, R., "Programming in C" , McGraw Hill, New York
2. Johnsonbaugh, R., and Kalin, M., "Applications Programming in C ", P.H.I.
3. RAJARAM, V., "Computer Programming in C", Prentice Hall of India
4. Balaguruswamy, E., "Programming inANSI C", Tata McGraw Publishing
5. Kanetkar, Y., "Data Structure through C", Tata McGraw Publishing
6. Sahni., "Data Structures"

S-1.3 Fundamentals of Management

Tasks, Philosophy & Functions of Management.

a) Human Resource Development (HR) : Meaning & Scope of HR, Role, Functions and Responsibility of Personnel Department

Manpower Planning: Source and Methods of Recruitment, Selection, test & interview methods

Training & Development: Need, Importance, and Principle of Training, On the Job Training, Off the Job Training.

Career Planning: Succession of Planning, Promotion Charts and Channel Cadres, Trade Testing, Performance, Appraisal and Rating

b) Marketing Management: Nature, Concept, and Scope of Marketing Management, Marketing Environment., Concept of Marketing Mix, The product Nature and types of products , Methods of Products Development , Product Life Cycle, Pricing policies, Distribution Policies, Promotion Strategies
Strategic Marketing: Formulation, Exception & Monitoring, Concept of Sale Promotion, Objective of Advertising Management, Role of Advertising in Economy, Marketing Information System, Introduction to Marketing Control.

c) Financial Management: Finance Functions(Concept Scope and its relationship with other functions), tools of Financial analysis (fund, Cash flow analysis, ratio analysis, risk return trade off) , financial forecasting(performance income Statement and balance sheet, cash flow forecasting under uncertainty, , Financial Planning),Estimation and Management of working Capital,(Operating Cycle Concept, inventory, accounts receivable, cash and accounts payables, working Capital requirements.

d) Production Management: Operation planning, and control (aggregate Planning, multiple product batch, Production Cycle, short term scheduling of Job, Projects, introduction to project time calculation through PERT/CPM), Management of supply chain, materials management (introduction to material management, system and procedures for inventory management planning, procurement of materials) Quality Management (Concept, Planning, Standardization & Circle).

e) Strategic Management: Firms and its Environment Strategic Resources, Industry Structure and analysis, evaluation of Corporate for growth and diversification's

Reference:

1. KotlerPhilips- " Principle of Marketing Management"
2. Agrwal R.D.-" Organisation and Management"
3. Massie-" Essential of Management"

S-1.4 Information Systems: Analysis, Design and Implementation

Overview of Systems Analysis and Design: Systems Development life Cycle, Concept and Models requirement determination. Logical Design, Physical Design, Test Planning Implementation Planning and Performance Evaluation; Communication, Interviewing, Presentation Skills; Group Dynamics; Risk and Feasibility Analysis; Group Based Approaches. JAD, Structures walkthroughs and Design and Code Reviews. Prototyping Database Design, Software Quality Metrics, Application Categories Software Package evaluation and equisition.

Information Requirement Analysis : Process modeling with physical and logical Data Flow Diagrams, Data Modeling with Logical Entity Relationship Diagrams;

Developing a Proposal : Feasibility study and cost estimation.

System Design : Design of input and control, Design of output and Control, File Design/Database design, Process Design, User Interface Design; Protyping; Software Constructions; Documentation.

Application Development Methodologies and CASE Tools: Information Engineering, Structured Systems Analysis and Design and Object oriented Methodologies for Application Development Data Modeling, User Interface Design and Prototyping, Use of Computer Aided Software Engineering(CASE) tools in Analysis, Design and Implementation , Object Oriented Database.

Design and Implementation of OOP's Plateform: Object Oriented and Design through Object Modeling Technique, Object Modeling Dynamic Modeling and Functional Modeling Object Oriented Design and Object Oriented Programming system for implementations, Object Oriented Database.

Managerial Issue in Software Projects: Introduction to Software Markets, Planning of Software Projects, Size and Cost estimation, Project Scheduling Measurement of Software Quality and Productivity, ISO and Capability Maturity Models for organizational Growth.

The Course should be based on the lectures case analysis and laboratory work cases should be used to illustrate each measure topic in the course.

References:

1. Haryszkiewyz, I.T., "Introduction of Systems Analysis and Design ", PHI
2. Rajaraman, V. , "Analysis and Design of Information Systems ", PHI
3. Senn, J.A., "Analysis and Design of Information Systems", Tata McGraw Hill
4. Whiten, J.K., Bentley, L.D., Beslow, V.M., "Systems Analysis and Design Methods" , Galgotia Publications Pvt Ltd

Semester: II

S-2.1- Object Oriented Programming with C++

Introduction : Object Oriented theme, Usefulness of Object Oriented Development Object modeling technique Object and Classes, Link and Associations, Coupling Constructs. Advance Object Modeling.
Aggregation, Abstract Class, Multiple 'Inheritance, Meta Data, Candidate Key Constraints, Nested State Diagram.
Advanced dynamic modeling; Concepts.
Functional Modeling: Functional Model, Data Flow Diagram, Relation of Functional to Object and dynamic model.
Dynamic model: Events and States, Operations, Nested State Diagram, Concurrency, Advance Dynamic Modeling, Concept, Sample Dynamic Model, Relation of Object and dynamic Model.
System Design: Overview, Breaking a system into subsystem, identifying concurrency allocation, Subsystems to processors and tasks, management of data stores, handling global data resource, choosing software control implementation handling boundary conditions, setting trade off priorities, command architectural framework, architecture of ATM systems.
Object Design:
Overview, Combining of Object Models, Design Optimization, Implementation of Control, Design of Association, Object Representation, Physical Packing. Implementation using C++

References:
1. James Rambaugh, Michael Blaha, W.Premerlani, F.Reddy, W. Lorensen : Object Oriented Modeling and Design.
2. Barkakati Nabajyotiz, Object Oriented Programming in C++.

S-2.2 Operating Systems:

Introduction: Evolution of Operating Systems, Types of OS, Different views of the operating systems, Operating Systems concepts and structure.
Processes : The process concept, system programmer's view of processes, The operating system services for process management, Scheduling algorithms, Performance evaluation.
Memory Management: Memory management without swapping or paging, swapping, memory page replacement algorithms, paging algorithms, design Issues for paging, segmentation.
Interprocess Communication and synchronisation: The need for synchronisation, mutual , semaphores, hardware solution to mutual exclusion, queuing, Implementation of semaphores, classical problems In concurrent programming, critical region and conditional region, monitors, messages, deadlocks.
File Systems: File systems, directories, file system Implementation, security protection mechanisms.
Input/Output: Principles of I/O Hardware: I/O devices, device controllers, Direct memory access.
Principles of I/O Software: Goals, Interrupt handlers, device drivers, device Independent software, User space, I/O software.
Disks: Disk hardware, scheduling algorithms, Error handling, track-at-a-time caching, M Disks.
Clocks: Clock hardware, memory-mapped terminals, I/O software.
Terminals: Terminal hardware, memory-mapped terminals, I/O software.
Processes and Processors In Distributed Systems : Threads, System models, processor, scheduling.
Distributed File Systems: Design, Implementation, and trends.
Performance Measurement, Monitoring and Evaluation: Introduction, Important trends performance Issues, why performance monitoring and evaluation are needed, performance measures evaluation techniques, bottlenecks and saturation, feedback loops.
Case Studies: MS-DOS, MS-WINDOWS, UNIX operating system.

References:
1. Deiltel. H.M. "An Introduction to Operating Systems" Addison Wesley Publishing

2. Milenkovic, M, Operating Systems. Concepts and Design". McGraw Hill International Computer Science Series 1992.
3. Galvin. Peter Baer., Abraham Sltberschatz, "Operating System Concepts". Addison Wesley Publishing Company, 1989.
4. Tanenbaum, A.S., "Modem Operating Systems", Prentice Hall of India Pvt. Ltd.

S-2.3 Discrete Mathematics:

Mathematical logic: Statements and Notation, Connectives, Normal Forms, Theory of Inference for the statement Calculus, Predicate Calculus, Inference theory of the Predicate Calculus.

Set-Theory: Basic Concepts of Set Theory, Representation of Discrete Structures, RelaUons and ordering, Functions, Natural Numbers, Recursion.

Algebraic Structures: Algebraic Systems, Semi groups and Monoids, Grammars and Languages, Polish Expressions and Their Compilation, Groups.

Lattices and Boolean Algebra: lattices as partially Ordered Sets, Boolean Algebra, Boolean Functions, Representation and Minimization or Boolean Functions, Finite-state machines.

Graph-Theory: Basic Concepts of graph theory, Storage representation, and Manipulation of Graphs – Trees, List and Graph. Simple precedence grammars.

eferences:

1.Tremblay., J.P. and Manohar R, "Discrete Mathematical Structures with Application to Computer Science", Tata Mc Graw Hill.

S-2.4 Principles of Accounting:

Basic Accounting and conventions underlying preparation of Financial Statements (balance sheet highlighting accounting equation, Profit and loss statement; accounting processes; basic accounts, trial balance and financial statements; Issues such as provisions for bad debts, tax, dividends, losses, such as bad debts, missing Information. Classification effect, cost of assets, rentals, etc), Income Measurement (revenue; recognition and matching costs and revenues; Inventory valuation), Depreciation Accounting; Intangible Assets Accounting; Understanding published annual accounts including fund flow statement.

Basic Cost Concepts: Introduction, cost classification, allocation, appointment and absorption, cost centers. Cost Analysis for Managerial Decisions (direct costing, break-even analysis; relevant costs; pricing-joint costs; make or buy; relevant fixed costs and sunk costs). Cost Analysis for Control (standard costing; variances; material labour, overhand, sales and profit), Standard Cost Accounting (budgeting and control; elements of budgeting; control of manufacturing and manufacturing expenses; performances appraisal, evaluation of cost control systems).

Introduction to Management Control Systems: Goals, Strategies, and Key Variables, Performance Measures, Responsibility Centers and Transfer Price. Investment Centers, Reporting Systems, Management by Objectives, Budgeting and Control, Organizational Relationships in Control; Control Dynamics; Top Management and Control; Strategic and long-range Planning; Control of Service Organisations; Control of Projects; Control of Non-Profit Organisations; Control of Multinational Companies.

Reference:

1. Bhatttacharya, S.K. and Dearden, John, "Accounting for Management", Prentice hall of India, New Delhi.
2. Chadwick, "The Essence of Financial Accounting", Prentice Hall of India Pvt Ltd.
3. Chadwick, "The Essence of Management Accounting", Prentice Hall of India.
4. Homgren, Sunden and Selto (9^{th} ed), "Introduction to Management Accounting", Prentice Hall of India.
5. Welch, Hilton and Gordon (5^{th} ed) "Budgeting : Profit Planning and Control", Prentice Hall of India.

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Semester: III

S-3.1 Database Management Systems:

Basic Concepts: Database & Database Users, Characteristics or the Database, Database Systems. Concepts & Architecture, Data Models, Schemas & Instances, DBMS Architecture & Data Independence, Data Base languages & Interfaces, Data Modeling using the Entity-Relationship Approach, E-R Diagrams. Data Dictionary.

Relational Model, Languages & Systems : Relational Data Model Concepts, Relational Model Constraints, Relational Algebra, SQL – A Relational Database language, Data Definition in SQL, View & Queries In SQL, Specifying Constraints & Indexes In SQL, Specifying Constraints lit Indexes In SQL, A Relational Database Management Systems ORACLE/MS-SQL Server.

Conventional Data Models & Systems: Network Data Model, Membership types & options in a set, DML for the network model, Navigation within a network database, Hierarchical Data Model, Hierarchical Database structure HSAM, HDAM & HIDAM organisation, DML for hierarchical model, Overview of IMS.

Relational Data Base Design: Functional dependencies, Normal forms based on primary keys (I NF, 2NF, 3NF, & BCNF), Loss-less Join & Dependency preserving decomposition, De-normalization.

Concurrency Control & Recovery Techniques: Concurrency Control Techniques, Locking Techniques, Time stamp ordering, Granularity of Data Items, Recovery Techniques, Recovery concepts, Database backup and recovery from catastrophic failures.

Concepts or Object oriented data base management systems, Data Warehousing, Data Mining

References:

1. Date, C.J., "An Introduction to Database Systems", Narosa Publishing House. New Delhi.
2. Desai. B., " An Introduction to Database Concepts", Galgotia Publications. New Delhi.
3. Elmsari and Navathe, "Fundamentals of Database Systems", Addison Wesley, New York.
4. Ullman, J.D., "Principles of Database Systems", Galgotia Publications. New Delhi.
5. Leon Brothers, "Database Management System", Vikas Publications.

S-3.2 Computer Communication Networks:

Introduction to Computer Network:

Advantages of networks, Structure of the communications network, point-to-point and multidrop circuits, data flow and physical circuits, network topologies, topologies and design goals. Hierarchical topology, horizontal topology (Bus), star topology, ring topology, mesh topology. The telephone network, switched and non-switched options, fundamentals of communications theory, channel speed end bit rate, voice communications end analog waveforms, bandwidth and the frequency spectrum, connecting the analog and digital worlds, digital signals, the modem, asynchronous end synchronous transmission.

Wide area and local networks, connection oriented and connection less networks, classification of communications protocols, Time Division Multiple Access (TDMA), Time Division Multiplexing (TDM), carrier sense (Collision) Systems, token passing, peer-to-peer priority systems; priority-slot, carrier sense (collision free) Systems, token passing (Priority) Systems.

Layered Protocols and the OSI model: Goals of Layered Protocols, network design problems, communication between layers, Introduction to standard organisation and the OSI model, standards organisation, Layers of OSI, OSI status.

Polling / Selection Protocols: Character and bit protocols, binary synchronous controls (BSC) HDLC, HDLC options, HDLC frame format, code transparency and synchronization, HDLC transmission process, HDLC subsets, SDLC. Protocol conversion.

Local Area Networks: Why LANs, Primary attributes of a LAN, Broadband and baseband and base LANs, IEEE LAN standards, relationship of the 802 standards to the ISO/CCITT model, connection options with LANs, LLC and MAC protocol data units, LAN topologies and protocol!, CSMA/CD and IEEE 802.3, token ring (Priority), token bus and IEEE 802.4, metropolitan area networks (MANs), ANSI fiber distributed data Interface., COMA and mobile communication.

Switching and Routing in Networks: Message switching, packet switching, when and when not to use packet switching, packet routing,

Packet switching support to circuit switching networks.

TCP / IP: TCP /IP and Internetworking, example of TCP/IP operations, related protocols, ports and sockets. The IP address structurem, major features of IP, IPV6, IP datagram. Major IP services. IP source routing, value of the

transport layer, TCP, Major features or TCP, passive and active operation, the transmission control block (TCB), route discovery protocols, and examples of route discovery protocols, application layer protocols.

Personal Computer Networks: Personal computer communications characteristics, error handling, Using the personal computer as a server, file transfer on personal computers, personal computers and local area networks, network operating systems (NOSs).

References:

1. Black. U., "Computer Networks. Protocols, Standards and Interfaces", Prentice Hall of India.
2. Tannenbum. A., "Computer Networks", Prentice Hall of India.

S-3.3. IT Elective – I

S-3.4. ENVIRONMENTAL MANAGEMENT

1. **Environment-** Elements, Process and Factors.
2. **The Atomosphere-** Composition, Structure and Factors [Light & Temperature]
3. **Environmental Toxicology-** Pollution and Pollutants.

Air Pollution – Nature and Source of Pollution Methods of Monitoring and Control of Air Pollution. Acid Rain, Photochemical smog, Green House Effect and Global warning, Ozone depletion, Effect of Pollutants on climatic changes.

Noise Pollution- Nature and Source of Noise Pollution, Noise Exposure limits and Standard, Noise control and abatement measures.

Radioactive and Thermal Pollution : 4. Computer Environment Management- Influence of Temperature, Humidity, Dust and noise interference on the performance of computer system. Promotion and maintenance.

5.Central Theme of Environmental Management, Environmental Management Plan, [EMP], Environment Act 1986 and Earth Summit 1992, Environmental Acts and Laws.

6.Global and National Environmental Protection.

7. Application of Systems Analysis Procedure to Ecology- Approach Mathematical Models and tools, Environment Research.

Reference:

1. Odum, E.P., "Fundamentals of Ecology", W.B., Saunders Company, London.
2. Vishwapremi, K.K.C., "Fundamentals of Toxicology", Central Book Depot, Allahabad.

Practicals:

S. 3.5 Oracle &Elective Lab

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Semester: IV

S-4.1 Visual Programming with Visual Basic:

Visual Programming – The Fundamentals of Visual Basic, Introduction, VB Editions, Working with Visual Basic IDE, The elements of the user-Interface, Designing the user-Interface, Programming an application, Visual Development and Event-driven programming, Customizing the environment.

Visual Basic The Language – Visual basic projects, the project file, variables, constants, Arrays, Collections, procedures, arguments, function returns values, control flow statements, looping statements, nested control structures, exit statement.

Working with forms - The appearance of the form, designing menus, building dynamic forms, drag and drop operations, mouse conflicts manual drag, dragging list Items.

Basic Active X Controls – The textbox control, the list box and combo box controls, the scroll bar and slider controls, the file controls.

Drawing with Visual Basic – Graphics controls, co-ordinate systems, graphics methods, optimisation Issues. Manipulating color and pixels, using the paint picture method, processign Images.

Advanced Active X controls- The common dialogs control, using the common dialog control, the treeview and Listview controls, The Imagelist control, viewing a folder and files, The rich text box control, the RTF language, the msflexgrid control.

Multiple document Interfaces – MDI applications, parent and child MDI forms, Accessing child forms, Implementing scrolling forms.

Recursive Programming – Basic concepts, recursion, binary search, scanning folders recursively, building a custom explorer, the stack mechanism, Special Issues In recursive programming.

Optimizing VB Application, The Windows API, OLE automation end VBA. Building Active X Components, Building Active X Controls.

Database Programming with VB – The Active Data objects, data environment, sql, mshflexgrid control, ado, Dao library Report designing using Data Report and Crystal report. Interfacing with MS-Access & Oracle database.

Packaging and distributing applications using application wizard / Visual Basic and The Web.

References:

Evangelous, P., "Mastering Visual Basic 6", Techmedia.

S-4.2 Software Engineering:

Software life Cycle: Waterfall, Spiral, Prototyping Fourth generation techniques. SW Process, Software requirements specification (SRS), Fact-Finding Techniques, Characteristics of a good SRS: Unambiguous, Complete, Verifiable, Consistent. Modiflable. Traceable and usable during the operation end Maintenance phase. Prototype outline for SRS.

System Analysis: SAURABHAMIT tools& Techniques, Prototyping, Structured Programming. Elements of good design, Design Issues, Features of a modern GUI. Menus, scrolling, Windows, Icons, Panels, Error messages, etc.

User Manual: User Profile, Contents of an User Manual: Student is urged to install and use a software using Its user manual and report the strengths and weakness of that user manual.

Software Configuration Mangement: Base line, SCM process, Version Control, Change Management.

Software quality assurance, ISO 9000 standards for software design. Software testing, software Project Management.

Computer Aided Software Engineering: CASE, Tools for Project management support, Analysis & design, Programming. Prototyping, Maintenance. Future of CASE.

References:

1. Jalote, P. "An Integrated Approach to Software Engineering". Narosa 1991.
2. Pressman. R.S., "Software Engineering, A Practitioner's Approach". Third Edition. Mc Graw Hil. International Edition, 1992.
3. Whitten, Bentley and Barlow, "System Analysis and Design Methods". Second Edition. Galgotia Publications 1996.

S-4.3 Statistical Computing & Optimisational Techniques:

Section- A : Moments, Correlation, Regression, Sampling Thereon.

Sampling Distribution & Tests of Significance: Test of Significance X^2 –Distribution, Distribution of sample mean and sample variable, t and f-distribution, large sample tests of mean and proportion. Test based on X2t and f-Distributions.

Time Series: Various components of a time series, their determination, Index numbers.

Statistical Quality Control

Section- B Linear programming – fundamentals, definition & problems of L.P.P., Transportation and Assignment.

Integral Programming- Gomery cutting plane methods – Branch and bound method.

Queering Theory- Characteristics gueving systems, steady rate M/M/I, M/M/1/K and M/M/C Queering Models.

PERT & CPM:

Arrow Networks- Time estimates- earliest expected time, latest allowable occurance time and slach-critical path probability of meeting scheduled date of completion of project-calculations on CPM Network-various floaks for activities critical path- updating project- operation time-cost trade off curve-Project Time Cost trade off curve- Selection of Schedule based cost analysis.

(Remarks: No Mathematical Derivations included)

References:

1. Kapur, J.N., H.C, Saxena – "Mathematical Statistics"
2. Kanti Swarup, P.K. Gupta & Manmohan " Operation Research".

IT- E4.3: Advanced Programming with Java;

Multithreading in Java – Multithreading, Creating Threads, Thread priorities, Synchronization, Inter thread Communication, Creating Animation Using Threads, Adding Sound to Animation Using Threads, Reducing Animation Flickering.

Abstract Window Toolkit – Understanding AWT, Using AWT Components, Layout Managers, Insets, and Case Study of an Example system.

Event handling in AWT- Event handling in Java, Handling Mouse clicks, Handling Mouse Movements, Handling keyboard Events, Handling Components events.

Streams and Object Serialization – Introduction to streams, Input Stream Class, Output Stream Class, Byte Array Input Stream Class, Byte Array Output Stream Class, File Stream, Filtered I/O, Character Array Streams, Buffered Reader and Writer Classes, Random Access File Class, Object Streams, Case study of an example system.

Data Structures Using Collection API, Introduction to Swing programming, Advanced Swing programming, Signed Applets, Security and JDBC.

URLs and Socket Programming, Distributed programming with Java, Java Beans.

References:

1. "Complete Reference to Java", TechMedia Publications.

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Semester: V

S- 5.1 Internet and Web Designing:

Internet Applications- Introduction to Internet, World Wide Web, Gopher, News Groups, Electronic Mail, Messaging, Internet Telephony. USENET system and its terminology. History of the Web, Growth of the web in past decade, protocols governing the web, web applications, Downloading information from Internet using FTP, FTP protocol, FTP command on different operating system. TCP/IP Protocol, HTTP, NNTP, SMTP, IMAP, POP, Telnet. Security aspects of the web.
Working with web browser – Internet Explorer / Netscape Navigator. Setting up Internet connection using dial-up or leased line. Browsing the internet. Web based E-mail service provider, Mail reader- Outlook / Communicator. Instant Messaging using MSN Messenger/ Yahoo Messenger. MIRC, Public Chat rooms participation using Ms-Chat, Web Folder. Setting up Proxy.
Web Page Designer – Front Page, Visual Interdev, HTML language, HTML Tags, designing web pages using HTML/ DHTML. Scripting Languages- VB Script / Jscript. Using Cookies on web page, Designing Forms on web page. Using Free web site hosting provided by companies like Yahoo, angelfire etc on Internet for setting up a web site. Placing images, animations and sound on web page. Using hit counter on a web page.

Setting up a local web server using IIS or PWS on windows machine, Using UNIX system to host a website. Designing pages using ASP or CGI/PERL. Interfacing with Database, Web pages providig Interface for storing information into database, perform query in database, showing reports using database on a web page.

S-5.2 Computer System Architecture:

Introduction of Parallel Processing : Introduction of Parallel Processing : Parallel Processing mechanism, Parallelism in uniprocessor system, parallel computer models.
Program and Network Properties: Conditions of parallelism, program partitioning and scheduling, program flow mechanism, system interconnect architecture.
Processor and Memory Hierarchy: Advance processor technology, super scalar and vector processors, memory hierarchy technology, and virtual memory technology.
Bus Cache and Shared Memory: Back plane bus system, cache memory organisations, shared memory organisation.
Scalable Multithread and Dataflow Architectures: Latency hiding techniques, principles of multi-threading, scalable and multithreaded architecture, data flow and hybrid architecture.
References:

1. Hwang, K: “Advance Computer Architecture”, McGraw Hill.
2. Hwang, K & Briggs, F.A.: “Computer Architecture and Parallel Processing”, McGraw Hill.
3. Evans, D.J. : “Parallel Processing System”, Cambridge University.

S-5.3 – IT Elective III
S-5.4 B.M. Elective I
S-5.5 Organisational Behaviour :
Introduction: Introduction to Organisation, components of organisation, nature and variety of organisations (in terms of objectives, structure etc.) models of analysing organisational phenomena, organisational and business variables, organisations in the Indian context, Institutions and structures, basic roles in an organisations, etc., perception, attitudes, motives (achievement, power

and affiliation), commitment, values creativity and other personality factors, profile of manager and an entrepreneur.

Interpersonal and Group Process – Interpersonal trust, understanding the other person from his/her points of view, interpersonal communication, listening, feedback, counselling, transactional analysis, self-fulfilling prophecy, etc., leadership, motivating people, working as a member of a team, team functioning, team decision-making, team conflict resolution, team problem solving.

Organisaitional Structure and Integrating and Group Dynamics-Elements of structure, functions of structure, determinants of structures, dysfunctionalities of structures, structure-technology-environmental people relationships, principles underlying design of organisations; organisational change, Application of IT in change process, Integrating Cases(s).

Case method and lectures should be supplemented with a variety of other methodologies such as feedback on questionnaires and tests, role plays, and behaviour simulation exercise.

References:

1. Dwivedi, R.S., "Human Relations and Organisational Behaviour" : A global Perspective, Macmillan India Ltd.
2. Arnold, John, Robertson, Ivan T and Cooper, Cary. L. "Work Psychology: Understanding Human Behaviour in the Workplace", MacMillan India Ltd.
3. French and Bell, "Organisation Development : Behavioral Science Inerventions for Organisations Improvement", Prentice Hall of India.
4. Hersey and Blanchard, "Management of Organisational Behaviour: Utilizing human Resources", Prentice Hall of India.
5. Prasad, Kesho, "Organisational Development for Excellence", Macmillan India Ltd.
6. Robbins, "Essentials of Organisational Behaviour", Prentice Hall of India.

S-5.6 Internet & Web Designing Lab & Elective Lab.

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Semester VI

S-6.1 - Seminar

S-6.2 - Project

List of Electives

IT – E3.1: SQL Server

Introduction- SQL Server 2000. Relational Database Management System and Conventional database systems. Installing SQL Server. Working with Enterprise Manager. Configuring a Database. Creating Tables, Views. Defining constraints, Creating relationships. Designing Database diagram. Creating Indexes. Creating user-defined data types, Creating Stored Procedures and Functions.

Working with Query Analyzer. Writing queries. Using relational operators like project, join, Intersect, union, difference. Built-in SQL functions. Performing data manipulation from query analyzer. Query optimization.

Creating Users, Setting up security, Granting Permissions and authorizations. Defining roles, Performing backup and recovery. Importing and exporting tables.

Using OLE DB, ADO for interfacing with front-end applications designs in VB etc.

References:

IT – E3.2: Developer- 2000

Introduction- Oracle Application Development Tools. Windows Interface, Object Navigators, Toolbars, Properties window, Layout Editors, PL/SQL Editors, Defaulting Capabilities, Interactive Debuggers, Online Documentation, Object-Oriented features.

Introducing Oracle Forms, Forms Modules, Windows, Canvas views, Stocks, Items, Triggers. Designer- Object Navigator, Properties Window, Layout Editor, List of Values, PL/SQL Editor, Menu Editor, Libraries.

Introducing Oracle Reports- Queries, Fields, Triggers, Object Navigator, Report Designer Toolbar, Property Sheets, Data Model Editor, Parameter from editor, Program unit editor, Default layout, Default parameter form.

Introducing Oracle Graphics- Queries, Charts, Templates, Triggers, Designer Object Navigator, Graphics Designer Toolbar, Property Sheet, Layout Editor, Chart Template Editor.

References:

1. Bayross, Ivan., "Commercial Application Development using Oracle Developer 2000 Forms 5.0" BPB Publishing.

IT – E3.3: Object-Oriented Programming and Java:

Introduction to Java – What is Java, Java versions and Environments, Features of Java, Program Types in Java, Java Language Components, Programming Constructs, Arrays.

OOP in Java – Object Oriented Programming Concepts, Creating Classes and Objects, Memory Management, Casting, Constructors, Comparing Objects, Inheritance, Polymorphism, Command Line Arguments, Reflection Class, Case study of an example system.

Abstract Class, Interface and package – Modifiers and Access Control, Abstract Classes and Methods, Interfaces, What are Packages ?

Applets and 2D Graphics- Overview of Applets, Passing Parameters to Applets, Graphics, Fonts and Colors, Adding Images to Applets, Adding Sound to Applets, Copying and Clearing Screens, Using Java 2D.

Exception handling – Understanding Exceptions, How to Handle Exceptions, Multiple catch clauses, Nested try statements, Creating user – defined exceptions, When not to use exceptions.

Multithreading in Java – Multithreading, Creating Threads, Thread priorities, Synchronization, Inter thread Communication, Creating Animation Using Threads, Adding Sound to Animation Using Threads, Reducing Animation Flickering.

References:

1. Balaguruswamy, E., "Java Programming".
2. IT – E4.1: Object-Oriented Software Engineering:

Introduction- System development as an Industrial process. The system life cycle. What is object orientation, Object, Class and Instance, Polymorphism, Inheritance. Object-oriented system development-analysis, construction, testing. Object-oriented programming.

Architecture, Model architecture, Requirements model, Analysis model, design model, Implementation model, test model, Analysis, Working with construction, Real-time specialization, Database specialization, Components, Testing – On testing, Unit testing, Integration testing, System Testing, Testing Process.

Application- Case study, Managing object-oriented software engineering.

Other object-oriented methods, Object-Oriented Analysis, Object-Oriented Design, Hierarchical Object-Oriented Design, Object Modeling Technique, Responsibility-Driven Design.

References:

1. Jacobson, Christerson, Jonsson, "Object-Oriented Software Engineering", Addison Wesley Publishing.

IT – E4.2: Distributed Programming with COM/DCOM

Introduction to Distributed Programming, Distributed Programming Model.

Components- Components Benefits, Requirements, COM.

The Interface, Implementing a COM Interface, Building blocks. Querying for Interfaces, Query Interface Rules and Regulations, Defines the component, Handling new versions of components.

Reference counting, Lifetime control, Overview. Implementing AddRef and Release, Optimizing reference counting, Rules.

Dynamic Linking, Creating the components, Exporting a function from a DLL, Loading DLL. HRESULTs, GUIDs, the Registry and others. COM Library functions.

Class Factory. Co Create Instance, Class factories, Implementing the class factory, Multiple components in a DLL, Unloading the DLL.

Component Reuse-Containtment and Aggregation, Implementation, Client-side, Server side simplification, Servers in EXEs, Different processes, Introduction to IDI/MIDI, Local Server Implementation, DCOM, How DCOM works, Other DCOM features.

Dispatch Interfaces and Automation, Using Idispatch, Type Libraries, Idispatch Implementation, Multiple Threads, COM Threading Models, Implementing Apartment Threading, free Threading.

References:

1. Rogerson., Dale., "Inside COM", (Microsoft Press) WP Publishers.
2. SAMS Series, "COM/DCOM Uneashed", Techmedia.

IT- E4.3: Advanced Programming with Java;

Multithreading in Java – Multithreading, Creating Threads, Thread priorities, Synchronization, Inter thread Communication, Creating Animation Using Threads, Adding Sound to Animation Using Threads, Reducing Animation Flickering.

Abstract Window Toolkit – Understanding AWT, Using AWT Components, Layout Managers, Insets, and Case Study of an Example system.

Event handling in AWT- Event handling in Java, Handling Mouse clicks, Handling Mouse Movements, Handling keyboard Events, Handling Components events.
Streams and Object Serialization – Introduction to streams, Input Stream Class, Output Stream Class, Byte Array Input Stream Class, Byte Array Output Stream Class, File Stream, Filtered I/O, Character Array Streams, Buffered Reader and Writer Classes, Random Access File Class, Object Streams, Case study of an example system.

Data Structures Using Collection API, Introduction to Swing programming, Advanced Swing programming, Signed Applets, Security and JDBC.
URLs and Socket Programming, Distributed programming with Java, Java Beans.
References:

IT – E5.1: Computer Graphics:
I/O Devices: Study of various input and output devices, CRT, LCD.
Line Generation : Points, lines, planes, vectors, pixels and frame buffers, vector and character generation.
Graphics primitives: Display devices, primitive operations, display file structures, display control text.
Polygons: Polygon representation, entering polygons, filling polygons.
Transformation: Matrix Transformation, transformation routines, display procedures.
Segments: Segment table, creating, closing, deleting and renaming a segment visibility. Image transformation.
Windowing and Clipping: Viewing transformation, clipping, generalized clipping, multiple windowing.
Interaction: Hardware Input device handling algorithms, event handling, echoing interactive techniques.
Three Dimension: 3D Geometry primitives, transformation, projection, clipping.
Hidden line and Surface: Back-face removal algorithms, Hidden Line methods. Randering and Illumination.
Introduction to curve generation, Bezier, Hermits and B-spline algorithms and their comparison.
References:

1. Gilof, W.K., "Interaction Computer Graphics", Prentice-Hall.
2. Memmon, W., Sprout, R.F., "Principles of Interactive Computer Graphics", Mcgraw-Hill.
3. Rogers, D.F., "Procedural elements for Computer Graphics", Mcgraw-Hill.
4. Herrington, S., "Computer Graphics : A Programming Approach", Tata McGraw-Hill.
5. Foley, J.D., Van dam A, "Fundamentals of the Interactive Computer Graphics", Addison Wesley.
6. Hearn D., Bakar P.M., "Computer Graphics", Prentice Hall.

IT –E5.2: Artificial Intelligence and Application:
Overview of Artificial Intelligence, AI Definition, AI and its application area, Importance of AI, Early works in AI.
Knowledge: General Concepts, Definition and Importance of Knowledge. Knowledge Layout Systems, Representation of Knowledge, Knowledge organization and manipulation. Acquisition of Knowledge.

LISP and other AI programming languages. Introduction in LISP, Functions, Predicates and Conditionals, Input, Output and Local variables. Iteration and Recursion, Property Lists and Arrays PROLOG and other AI Programming languages.

Formalized Symbolic Logics: Syntax and Semantic for Propositional Logic Systems and Semantic FOPL, Properties of Wffs, Conversion in Clausual form, Inference rules,, The resolution principle, Non-deductive Inference Methods, Representation using rules.

Dealing with Inconsistencies and Uncertainties.

Probabilistic Reasoning: Introduction, Bayesian Probabilistic Inference, Possible world representations, Dampster Shafer Theory. Adhoc Methods. Heuristic reasoning Method.

Structured Knowledge Graphs, Frames and Related structure.

Object oriented representations.

Search and Control strategies, Matching techniques, Knowledge organization and Management.

Natural Language processing, Pattern Recognition, Visual Image understanding. Expert System Architectures.

General concepts in Knowledge Acquisition, Early work in machine learning, Learning by induction examples of other inductive learners.

Reference:

1. Patterson, Dan W., "Introduction to Artificial Intelligence and Expert Systems", PHI Publication.

IT –E5.3: Computer Network Security:

Introduction: Networking Terminologies, Active vs Passive Attacks, Layers and Cryptography, Authorization, Viruses, Worms, Trojan lorses. The Multi-Level Model of Security Legal Issues.

Cryptography: Introduction, Breaking an Encryption Scheme, Types of Cryptographic Functions-Secret Key, Public Key, and Hash Algorithms. Data Encryption Standards, International Data, Encryption Algorithm, Advanced Encryption Standard, RC4 Modes of Operation, Encrypting a large message, Generating MACs, Multiple Encryption DES. Public Key Algorithm, Modular Arithmetic, RSA, Diffle-Hellman, Digital Signature Standard.

Authentication: Password based, Address based, Cryptographic authentication protocols, Eavesdropping and Server Database reading, Trusted Intermediaries, Session Key, Authentication of People, Security Handshake pitfalls.

Standards: Kerberos V4, Karberos V5, Ipsec: AH and ESP, SSL/TLS.

Electronic Mail Security, PGP (Pretty Good Privacy).

Firewalls, Web Issues.

References:

1. Kaufman, Charlie, and Perlman., Radia., Speciner., Mike, "Network Security: Private Communication in a Public World" (2nd Ed), EEH-PHI.

IT-E5.4; Geographical Information System (GIS) & Environmental Model:

Modeling the Environment with GIS: Introduction, GIS and Environmental Modeling, Evolution of GIS. Modeling Frameworks- Complex Environmental Systems, Environmental Phenomena and Complex Systems, Environmental Modeling and Geocomputation.

Spatial Decision Support Systems and Environmental Modeling Introduction. A flexible Multithread spatial decision support system. Applications of SDSS using environmental models.

GIS Data Sources and Measurement Technologies for modeling, Environmental modeling, Data and GIS, Data Types, Sources and Issues. Remotely Sensed Data and Data Capture, Global Positioning System (GPS), Data Access and Distribution, Websites for Environmental and GIS Data.

Development, Calibration and Validation of Physical Models: From Real World to Abstract models, Modeling Goals, Model Structure, Physic-Mathematical Equations, Discrete Equations and Computer Codes, Calibration of the model, model validation.
Dynamic Systems Modeling and Four Dimensional Geographic Information Systems. Space Time Modeling in GIS context, Models and Modeling. Time Dimension and the GIS, Modeling Space Time Systems, Case Study.
Modeling Human Environmental Systems, Modeling Physical Systems.
Integrative Environmental Modeling, Visualizing Environmental Data.
Case Studies in GIS, GIS/FM.

References:

1. Clarke., Keith C., Parks., Bradley O, Crane Michael P., "Geographic Information Systems and Environmental Modeling", (EEE) PHI.

IT- E5.5: E-Commerce:

Introduction: Electronic Commerce Framework, E-Commerce Applications, Network Infrastructure for e-commerce, Network access equipments. The Internet as a network Infrastructure, NSNET. Business of Internet Commercialization, Network security and the walls. E-commerce and World Web web, WWW as the architecture. Web background , Hypertext Publishing, Security and the web Consumer oriented electronic Commerce, Mercantile Process Models, Electronic Payment Systems.
Interorganizational Commerce and EDI, EDI Applications in Business, Legal, Security and Privacy Issues. Standardization and EDI, EDI Software implementation, EDI Envelope for message transport, VAN's Internet based EDI, Internal Information System, Workflow automation and coordination, Supply chain management.
Digital Library, Document Library, Types of Digital documents, Corporate data warehouses, Advertising and Marketing on the Internet. Consumer Search and Resource Discovery On Demand Education and Digital Copyrights.
Software Agents, Internet Protocol Suite, TCP/IP, Multimedia and Digital Video, Broadband Telecommunication, Mobile and Wireless computing fundamentals. Structured Documents.

References:

1. Kalakota & Whinston, "Frontiers of Electronic Commerce", Addition Wesley, Pearson Education.
2. Bayross., Ivan, "Web Enabled Commercial Application Development using HTML, DHTML, Script, Perl & CGI", BPB Publication.

IT- E5.6 Multimedia Technology:

Introduction, Emerging applications, Computer communications and Entertainment Product, bybook, Devices, distributed multimedia systems, synchronization, ortestration and QOS Architecture Frame work for multimedia system, Digital audio representation and processing, Video technology over multimedia, Digital Video and Image Compression, Operating system support for continuous media applications, Middle wave system services architecture, Multimedia Devices, Multimedia File system and Information models, Knowledge-based multimedia system, User interface, Various multimedia Software, Performance parameters of multimedia system, concept of open shared work space.

References:

1. John F, Koregel Buford, Multimedia System.
2. Raft Stenmetz and Klara Mashrsled Multimedia computing communication & Application.

BM – F5.1: Managerial Economics:
Nature and Scope of managerial economics. Objectives of the firm. Managerial and behavioral theories of the firm. Concepts of opportunity cost, incremental, time perspective Principles of discounting and equal margins. Demand analysis-purposes and concepts. Elasticity of demand. Methods of demand forecasting.
Product and Cost analysis: Short run and long run average cost curves. Law of supply, Economics and diseconomics of scale. Law of variable proportions.
Production function: Single output isoquants.
Pricing: Prescriptive approach. Price determination under perfect competition. Monopoly, oligopoly and monopolistic competition, full cost pricing, product line pricing. Pricing strategies.
Profits: Nature and measurement policy. Break-even analysis. Case study.
References:
1. Dean J., "Management Economics", Prentice Hall of India.
2. Mote, V.L., et. Al. "Managerial Economics: Concepts and Cases", Tata McGraw Hill.

BM-5.2: Business Finance
Financial and Economics development, Intermediation, role and patterns. Functions of money and capital markets. Interest cases determination, term structure.
Primary Capital Market: new issues, growth and tends.
Financial Intermediaries: Merchant bankers, Managers, Brokers, Underwriters. Secondary market- organization and functioning. Trading and settlement. Problems resisting to membership, commission, margins, arbitration and off-floor trading. Reforming the markets.
SEBI.
Market for government securities- The discount and finance house. Operation and managerial problems of commercial banks. Inter-bank call money market. Non-banking financial institutions: lending policies, schemes, composition and quantum of assistance of IDBI, IFCI, ICICI, UTI, LIC, GIC and state level financial corporations.
Credit Rating Information: Parameters Role, Agencies, crish. Regulatory framework for financial markets and institutions, regulation versus deregulation. Role of RBI, Bank rate, open market operation policies.
References:
1. Copeland, TE., et. at. "Financial Theory and Corporate Policy", Addison Wesley.
2. Uppal., J.S., "Public Financial Institutions in India", MacMillan.