

MCA (w.e.f June 2010-11)

I Year			Instructional System							Credits	Marks
Course code	SLM Code	Name of Subject	PC P	A W	V G D	PD P	PE C	P P W	I I L		
MCA-1	C-101	Computer Fundamentals & Programming in C	√	√	√		√			4	100
MCA-2	C-104	Data Structure Through C	√	√	√		√			4	100
MCA-3	C-109	DBMS	√	√	√		√			4	100
MCA-4	C-110	(A) Operating System with Unix & Shell programming	√	√	√		√			8	100
	C-116	(B) Computer Organization									
MCA-5	C-111	(A) System Analysis & design	√	√	√	√				8	100
	C-114	(B) CBNST									
MCA-6	C-113	Mathematics & Graph theory	√	√	√					6	100
MCA-7	M-213	(A) Accounting & Financial Analysis	√	√	√	√				8	100
	M-215	(B) Organizational Behaviour									
MCA-8	-	Practical covering MCA-01 to 04					√			8	200
Total										50	900

MCA

II Year			Instructional System							Credits	Marks
Course code	SLM Code	Name of Subject	PC P	A W	V G D	PD P	PE C	P P W	I I L		
MCA-9	C-138	Computer Network	√	√	√					4	100
MCA-10	C-129	Design Analysis of Algorism	√	√	√					4	100
MCA-11	C-105	Object Oriented Programming & C + +	√	√	√		√			4	100
MCA-12	C-133	Computer Based Optimization Techniques	√	√	√					4	100
MCA-13	C-112	(A) Visual Basic	√	√	√		√			8	100
	C-107	(B) Discrete Mathematics									
MCA-14	C-117	(A) Internet & E-Commerce	√	√	√					8	100
	C-118	(B) MIS									
MCA-15	C-136	Modeling & Simulation	√	√	√		√			4	100
MCA-16	C-137	Internet & Java Programming	√	√	√		√			4	100
MCA-17	-	Practical covering MCA- 11, 13, 15 & 16	√	√						6	150
Total									46	950	

MCA III Year

III Year			Instructional System							Credits	Marks
Course code	SLM Code	Name of Subject	PC P	A W	V G D	PD P	PE C	P P W	I I L		
MCA-18	C-146	(A) Web Technology	√	√	√		√			8	100
	C-140	(B) Software Engineering									
MCA-19	C-139	.Net Framework & C + +	√	√	√		√			4	100
MCA-20	C-141	Data Warehousing & Mining	√	√	√					8	100
MCA-21	C-142	(A) Artificial Intelligence	√	√	√	√				4	100
	C-143	(B) Neural Network									
MCA-22	C-134	(A) Computer Graphics	√	√	√					8	100
	C-135	(B) Multimedia System									
MCA-23	C-144	(A) Mobile Computing	√	√	√					8	100
	C-145	(B) ERP Systems									
MCA-24	-	Practical covering MCA-18 & 19					√			6	100
MCA-25	-	Project (6 Months entrepreneurship) compulsory					√	√	√	6	250
Total									52	950	

I YEAR

COMPUTER FUNDAMENTAL AND PROGRAMMING IN C C-101

SECTION A

Number System: Decimal, Octal, Binary & Hexadecimal, Representation of Integer, fixed and floating points, character representation : ASCII, EBCDIC.

SECTION B

Functional Units of Computer : I/O devices, primary and secondary memories.

SECTION C

Programming Fundamental : Algorithm development, techniques of problem solving, flowcharting, stepwise refinement, algorithm for searching sorting exchange and insertion merging of order lists.

SECTION D

Representation of integers, character, reals, data types, constants and variables, arithmetic expression, assignment statement logical expression, sequencing, alteration and iteration, arrays, string processing, sub program, recursion, files and pointers testing and debugging of program.

DATA STRUCTURE THROUGH 'C'
C-104

SECTION A

1. Problem solving concepts, top down and bottom up design structured programming.
2. Concept of data type and data structure, differences between data type and data structures, view of data structures at logical level, implementation level and application level, built-in-data structures and user defined data structures.

SECTION B

3. Concepts of dynamic variables, difference between static and dynamic variables, concepts of pointer variables.
4. Study of the following user define data structures using static and variables.
 - Built-in data structures like arrays, records.
 - User defines data structures like stacks, queues, linked. User defend data structures like stacks, queues, linked lists, circular linked lists, doubly linked list.

SECTION C

5. Non-linear data structures: trees, terminology of trees, concepts and applications of binary trees, tree traversal techniques and algorithms.

SECTION D

6. Sorting and searching algorithms and their efficiency considerations.
7. Considerations for choice of proper data structure.

DATA BASE MANAGEMENT SYSTEM
C-109

SECTION A

1. Introduction

Purpose of database, data models, instances & schemas, data independence, data definition language, data manipulation language, database manager, database administration.

SECTION B

2. Entity Relationship Model

Entity & Entity sets, relationship sets, mapping constraints, candidate & primary Key, entity relationship diagram, reducing E-R diagram to tables.

3. Relational Model

Concepts of relational model, integrity constraints, extension & intension, relational algebra, relational calculus, commercial query language, modifying the database, comments on relational model.

4. DBMS based on relational Model

Introduction, the mapping operation, data manipulation facility, data definition facility, data control facility.

SECTION C

5. Normalization

Introduction to functional dependence, normalization- 1NF,2NF,3NF,4NF,5NF.

SECTION D

6. Oracle Ingress or Sybase

Creation of tables, modification of tables, DDL command for RDBMS, SQL command for RDBMS, command language.

**OPERATING SYSTEMS WITH UNIX
AND SHELL PROGRAMMING
C-110**

SECTION A

Operating System Fundamentals

Introduction Concepts: Operating system function and characteristics, historical evolution of operating system, Real time systems, Distributed system, Methodologies for implementation of O/S service, system calls, system programs, Interrupt mechanisms.

SECTION B

I/O System, File Management and Process Scheduling

File system: Function of the system, File access and allocation methods, Directory structure, file protection mechanisms, implementation issue, hierarchy of file, disk scheduling policies.

Process Scheduling: Process, PCB, state transition, Level of Scheduling Comparative study of scheduling algorithms.

SECTION C

Feature of UNIX, directory structure of UNIX, File structure of UNIX, concept of inodes. Logging into Unix, format of UNIX components, basis operations on files, filters and pipelines mail and communication commands.

SECTION D

Shell Script

Types of shells, control structure for shells and I/O for shells. Use of Editors, VI, EX & Ed.

COMPUTER ORGANISATION

C-116

Section A

Number Systems and Logic Gates

Number system, Binary arithmetic, Gray code, BCD, Logical Gates, Boolean Algebra, K-Map simplification, SOP forms, POS forms.

Section B

Logic Circuit and CPU organization

Half adder, Full adder, Flip-Flops (SR, JK, D & T) Counters, Registers. Basic computer architecture, Function Organization, Register organization, Arithmetic, Logic unit, Pipeline, Central processing unit instruction formats.

Section C

Addressing Model, Pipelining and RTL

Addressing modes, Data transfer and manipulation, Interrupts, RISC/CISC architecture. Register transfer and micro-operations, Register transfer language (RTL), Arithmetic, Logic and Shift micro-operations.

Section D

Memory and I/O Organization

Micro-program Control Organization: Control memory, Address sequencing, Micro-program sequencer, Processor V/s Memory speed, High-speed memories, Cache memory, direct mapping, Set Associative Mapping, Fully Associative Mapping. Input/Output Organization: Peripheral devices, I/O interface, Asynchronous Data Transfer: Strobe Control Handshaking Data transfer schemes (Programmed, Interrupt Initiated, DMA transfer), I/O Processor.

SYSTEM ANALYSIS AND DESIGN

C-111

SECTION (A)

1.Introduction

Concepts of a systems, examples of systems, types of systems – open and closed, static and dynamic with examples.

2.Overview of system analysis and Design

System development life cycle, brief introduction to analysis, implementation and testing and maintenance.

SECTION (B)

3.Preliminary Investigation

Project selection, scope definition and preliminary investigation.

4.Feasibility study

Technical and economic and operational feasibility, cost and benefit analysis.

SECTION C

5.Requirement Specification and analysis

Fact finding techniques, data flow diagrams, data dictionaries, decision trees and tables.

6.Detailed Design

Module Specification, file design, database design.

SECTION D

7.Testing and Quality Assurance

Maintenance, unit and integration testing techniques, design objectives, quality factors such as reliability correctness etc.

8.User Education and Training

Issues in user education and training, method of educating and training the user.

**Computer Based Numerical and Statistical Techniques
C-114**

Section A

Solution of Transcendental Equation: Bi-section method, Regula Falsi method, Newton Raphson method, and Secant method.

System of simultaneously non-linear and algebraic equation:- Gauss elimination method, Gauss seidel alternative method, Gauss Jordan's method, Jacobi's iteration.

Section B

Operation, E , Δ , ∇ Algebraic properties of E and Δ , Relation between operators, Differences table, Forward difference, Backward difference, Central difference, Factorial Notation, divided difference, Language's Interpolation formula for unequal intervals.

Section C

Numerical Integration: The trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 Weddle's rule.

Numerical solution of ordinary differential equation: Euler's method, Taylor's series, Runge-kutta method.

Section D

Introduction to Statistics: Meaning, Scope of statistics, Mean, Mode, Median, Standard Deviation, Variance.

Bivariate Data: Correlation, Karl's Pearson Coefficient, Rank correlation, Numerical based on regression lines (using least square method).

MATHEMATICS AND GRAPH THEORY
C-113

SECTION – A

Sets and elements, universal set and empty set, subsets, Venn diagrams, set operations, Algebra of sets, Cartesian product, Relations, mappings, Countable and uncountable sets, Domain and range, propositional logic, FOPL ,Logical equivalences, quantifiers.

SECTION-B

Partially ordered sets, External elements of partial ordered sets, Least upper bound and greatest lower bound, Finite Boolean algebra, Lattices, Bounded lattices, Distributive lattices.

SECTION-C

Matrices, matrix addition and scalar multiplication, Transpose, Inverse, Determinants, Eigen values and Eigen vectors.
Permutations, Combinations, Pigeon hole principle, Elements of Probability, Conditional Probability, Baye's Theorem.

SECTION-D

Tree, Binary tree, Traversals, Huffman's algorithm, Minimum spanning trees, Euler graph , Hamiltonian cycle, Cutsets, Matching, Coloring.

ACCOUNTING AND FINANCIAL ANALYSIS

M-213

1. Meaning and Scope of Accounting

Need, Development and Definition of Accounting; Book- Keeping and Accounting; Persons interested in Accounting; Disclosures; Branches of Accounting; Objectives of Accounting.

2. Accounting Principles

International Accounting Standards (Only Outlines); Accounting Standards in India.

3. Accounting Transactions

Accounting Cycle; Journal; Rules of Debit and Credit; Compound Journal Entry; Opening Entry; Relationship Between Journal and Ledger , Rules Regarding Posting; Trial Balance ; Sub Division of Journal.

4. Capital and Revenue

Classification of Income; Classification of Expenditure; Classification Receipts. Accounting Concept of Income ; Accounting Concepts and Income Measurement; Expired Cost and Income Measurement.

Final Account; Profit and Loss Account; Balance Sheet; Adjustment Entries. Rectification of Errors; Classification of Errors; Location Of Errors; Suspense Account; Effect on Profit.

5. Depreciation Provision and Reserves

Concept of Depreciation; Causes of Depreciation; Depreciation, Depletion, Amortization and Dilapidation; Depreciation Accounting; Methods of Recording Depreciation; Methods for Providing Depreciation; Depreciation of Different Assets; Depreciation of Replacement Cost; Depreciation Policy as per Accounting Standard; Depreciation Accounting; Provisions and Reserves.

6. Accounts of Non- Trading Instructions

Not for Profit Organization, Financial Statements, Income and Expenditure Account, Balance Sheet.

ORGANIZATIONAL BEHAVIOUR

M-215

SECTION -A

Organizational Behavior : Definition, Meaning and its importance, Marvin Daunette's six plan.

Models of OB : Autocratic, Custodial, Supportive Collegial Model, Knowledge Management Processes.

New Challenges to OB : Open System, Contingency Approach.

SECTION -B

Personality : Meaning and Definition, Determinants of personality.

Traits Theory : Personality and Behavior.

Perception : Definition, Perceptual Process, Perception and Organizational Behavior and Applications , Performance Appraisals.

SECTION -C

Learning : Nature and Definition , Foundations of Individual behavior , Myth or Science, O.B., Attitude and its Measurement.

Motivation : Definition, Role of Motivation in Organizations , Maslow need Hierarchy Theory Needs Theory.

Leadership : Meaning and Definition, Theories, Behavior of Leader, Managerial Grid, Qualities of Effective Leader.

SECTION -D

Group : Nature and Concept, Effects of Cohesiveness of Group Productivity, Group Decision- making , Team Building.

Conflict : Nature of Conflict, Frustration ,Role Conflict and Ambiguity, Conflict Resolution

Determinants of Organization Design : Implications for managers, Significances of power and politics, power Imbalances, Managing Organization Conflicts, Three Modes of Resolving Inter- group Conflicts.

II YEAR

COMPUTER NETWORKS (MCA –C-138)

Unit 1:

Introduction : Overview of computer network, seven-layer architecture, TCP/IP suite of protocol, etc. Mac protocols for high-speed LANs, Mans & WIRELESS LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet etc.)
Fast access technologies. (For example, ADSL, Cable Modem, etc.)

Unit 2:

IPv6 : why IPv6, basic protocol, extension & option, support for QoS, Security, etc, neighbor discovery, auto configuration, routing. Change to other protocols. Application programming interface for Ipv6. 6bone.

Unit 3:

Mobility in network. Mobile. Security related issues. IP Multicasting. Multicasting routing protocols, address assignments, session discovery, etc.

Unit 4:

TCP extensions for high-speed networks, transaction-oriented application, other new option in TCP.

Unit 5:

Network security at various layers. Secure-HTTP, SSL, ESP, Authentication header, Key distribution protocols. Digital signatures, digital certificates.

DESIGN & ANALYSIS OF ALGORITHM (C-129)

UNIT I

Introduction : Algorithms, Analysis of Algorithms, Design of Algorithms, and Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences
Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort sorting
in Linear Time: Counting sort, Radix Sort, Bucket Sort medians and order statistics.

UNIT II

Elementary Data Structure : Stacks, Queues, Linked list, Binary Search Tree, Hash Table.

Advanced Data Structure : Red Black Trees, Splay Tress, Augmenting Data Structure Binomial Heap, BTree, Fibonacci Heap, and Data Structure for Disjoint Sets Union-find Algorithm, Dictionaries and priority Queues, mergeable heaps, concatenable queues.

UNIT III

Advanced Design and Analysis Techniques : Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis.

UNIT IV

Graph Algorithms : Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Travelling Salesman Problem.

UNIT V

Randomized Algorithms, String Matching, NP-Hard and NP-Completeness
Approximation Algorithms, Sorting Network, Matrix Operations, Polynomials and the FFT, Number Theoretic Algorithms, Computational GeometrOR.

OBJECT ORIENTED PROGRAMMING AND C++

C-105

SECTION A

OOP paradigm, Advantages of OOP, Comparison between functional programming and OOP approach, characteristics of object oriented Language objects, class, Inheritance, Polymorphism, and abstraction, encapsulation, Dynamic Binding, Message passing. Introduction to C++, Identifier and Keywords, constants, C++ Operators, Type conversion, Variable declaration, Statement, expression, User defined data types, conditional expression (For, While, Do-While, Do-While) loop statement, breaking control statements (Break, continue).

SECTION B

Defining a function, types of functions, Inline functions, Call by value and Call by reference, Preprocessor, Header files and standard functions, Structures, Pointers and structures, Unions, Enumeration.

SECTION C

Classes, Member function, Objects, Array of objects, Nested classes, Constructors, Copy constructors, Destructors, Inline member functions, static class member, friend functions, Dynamic memory allocation. Inheritance: Single inheritance, Multi – level inheritance, Hierarchical, Virtual base class, Abstract classes, Constructors in Derived classes, Nesting of classes.

SECTION D

Function overloading, Operator overloading, Polymorphism, Early binding, Polymorphism with pointers, Virtual functions, Late binding, Pure virtual functions, Opening and closing of files, Stream member functions, Binary file operations, classes and file operations, Random access file processing.

COMPUTER BASED OPTIMIZATION TECHNIQUES (C-133)

UNIT-I

Preliminaries : Inventory Models and Replacement Problems : Inventory models-various costs deterministic inventory models, Single period inventory model with shortest cost, Stochastic models, Application of inventory models, Economic lot sizes-price breaks, Replacement problems-capital equipment-discounting costs-replacement in anticipation of failure-group replacement-stochastic nature underlying the failure phenomenon.

UNIT-II

Linear Programming Problems (LPP) : Definition of LPP, Graphical Solutions of Linear Programming Problems, Simplex method, and Artificial Variable Method, Two Phase Method, Charnes' Big-M Method, Sensitivity Analysis, Revised Simplex Method, Duality, Dual simplex method.

UNIT-III

Integer Linear Programming Problems : Integer Linear Programming Problems, Mixed Integer Linear Programming Problems, Cutting Plane Method, Branch and Bound Method, 0-1 Integer Linear Programming Problem.

Transportation Problems : Introduction to Transportation Model, Matrix from TP, Applications of TP Models, Basic Feasible Solution of a TP, Degeneracy in TP, Formulation of Loops in TP, Solution Techniques of TP, Different Methods of Obtaining Initial Basic Feasible Solutions viz. Matrix Minima Method, Row Minima Method, Column Minima Methods, Vogel's Approximation Method, Techniques for Obtaining Optimal Basic Feasible Solution.

Assignment Problems : Definition, Hungarian Method for AP.

UNIT-IV

Introduction to NLP : Definition of NLP, Convex Programming Problems, Quadratic Programming Problems, Wolfe's Method for Quadratic Programming, Kuhn-Tucker Conditions, Geometrical Interpretation of KT-Conditions, KT-Points etc.

Dynamic Programming : Bellman's Principle of optimality of Dynamic Programming Multistage decision problem and its solution by Dynamic Programming with finite number of stages, Solution of linear programming problems as a dynamic Programming problem.

UNIT-V

Queuing Theory : Introduction to Queues, Basic Elements of Queuing Models, Queue Disciplines, Memory less Distribution, Role of Exponential and Poisson Distributions, Markovian Process, Erlang distribution, Symbols and Notations, Distribution of Arrivals, Distribution of Service Times, Definition of Steady and Transient State, Poisson Queues.

VISUAL BASIC C-112

SECTION-A

Visual basic environment and overview

Overview of main screen, menu bar, tool bar, tool box using menus, customizing a form, building user control, command buttons text boxes, labels images controls.

SECTION-B

Statements in visual basic, writing codes, dialog box, variable, type of variable string numbers,

SECTION-C

Writing procedures, VB programs structure, projects. Forms, modules, and frames, project with multiple forms displaying information on form, picture boxes, textboxes.

SECTION-D

Printer objects controlling program flow. Built in function user defined function and procedures. Arrays, grids & records. Object oriented programming, creating object, building classes.

DISCRETE MATHEMATICS
C-107

BLOCK 1: ALGEBRAIC STRUCTURES

Unit 1: Fundamental Concepts & Vectors

Groups, Rings, Fields, Spaces – Linear, Dependence of Vector, Linear Transformation, Bilinear forms, Eigen values and Eigen Vectors.

BLOCK 2: GRAPH THEORY

Unit 1: Fundamental Concepts ,Algorithm & Applications

Basic terminologies of graph theory, Multigraphs and weighted graphs, Path and circuits, Planar graphs, Trees and rooted trees, Spanning trees and cut sets, coloring covering and partitioning, directed graphs, enumeration of graphs, ideas on graphs theoretic algorithm and applications.

INTERNET AND E-COMMERCE
C-117

SECTION-A

Architectural framework of E-commerce

Web architecture, web browser, HTTP, TCP/IP, Webserver, HTML, Scripts standards:- EDIFACT, edi.

SECTION-B

Security Issue

Introduction to viruse , worms, bombs and protective measure and security issue, firewalls, and proxy application gateways, secure, electronic transaction, public and private key encryption, digital signature, and digital certificate.

SECTION-C

Electronic Payments Systems

Digital cash, electronic signature, debit cards at point of scale, smart cards, online credit cards based system, electronic fund EFT, payment gateways.

SECTION-D

Electronic Commerce Application

E-commerce banking, online shopping, business, models, and revenue models, online publishing, e- commerce in retail industry, CBS, digital copyrights, electronic data interchanges, electronic fund transfer, electronic display board, electronic catalogue.

MANAGEMENT INFORMATION SYSTEM (C-118)

Unit 1:

Foundation of Information systems: Introduction to information system in business, fundamentals of information systems, Solving business problems with information systems, Type of information system, effectiveness and efficiency criteria in information system.

Unit 2:

An overview of Management Information Systems : Definition of a management information system, MIS versus Data processing, MIS & Decision Support Systems, MIS & Information Resources Management, End user computing, Concept of an MIS, Structure of Management information system.

Unit 3:

Concepts of planning & control: Concept of organization planning, the planning process, Computational support for planning, Characteristics of control process, the nature of control in an organization.

Unit 4:

Business applications of information technology : Internet & electronic commerce, internet, extranet & Enterprise Solutions, Information System for Business Operations, Information System for managerial Decision support, Information System for Strategic Advantage.

Unit 5:

Managing Information Technology: Enterprise & Global Management, Security & Ethical challenges, Planning & Implementing changes.

Advanced Concepts in Information Systems : Enterprise Resource Planning Supply Chain Management, Customer Relationship Management, and Procurement Management.

MODELING & SIMULATION (C-136)

Unit-I

System definition and components, stochastic activities, continuous and discrete Systems, System modeling, types of models, static and dynamic physical models, statics and dynamic mathematical models, Full corporate model, types of system study.

Unit-II

System simulation, Why to simulate and when to simulate, Basic nature of simulation, technique of simulation, comparison of simulation and analytical methods, types of system simulation, real time simulation, hybrid simulation, simulation of pure-pursuit problem single-server queuing system and an inventory problem, Monte Carlo simulation, Distributed Lag models, Cobweb model.

Unit-III

Simulation of continuous systems, analog vs. digital simulation, of water reservoir system, simulation of a servo system, simulation of an autopilot, Discrete system Simulation, Fixed time-step vs. event-to-event model, generation of random numbers, Test for randomness, Generalization of non-uniformly distributed random numbers, Monte-Carlo computation vs. stochastic simulation.

Unit-IV

System dynamics, exponential growth models, exponential decay models, modified exponential growth models, logistic curves, generalization of growth models, System dynamics diagrams, Feedback in Socio-Economic systems, world model.

Unit-V

Simulation of PERT networks, Critical path computation, uncertainties in Activity duration, Resource allocation and consideration. Simulation software, Simulation languages, continuous and discrete simulation languages, Expression based languages, object-oriented simulation, general-purpose vs. application-oriented simulation packages, CSMP-III, MODSIM-III.

INTERNET & JAVA PROGRAMMING (C- 137)

Unit- I

Internet : Internet, Connecting to Internet: Telephone, Cable, Satellite connection, Choosing and ISP, Introduction to Internet services, E-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing.

Unit- II

Core Java : Introduction, Operator, Data type, Variable, Arrays, Control Statements, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling, Introduction to AWT, AWT controls, Layout managers, Menus, Images, Graphics.

Unit- III

Java Swing : Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress, Menu and Toolbars, layered Panes, Tabbed, Tabbed Panes, Split Panes, Layouts, Window, Dialog Boxes, Inner frame.

JDBC : The connectivity Model, JDBC/ODBC Bridge, java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database.

Unit- IV

Java Beans : Application Builder tools, the bean developer kit(BDK), JAR files, Introduction, Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB).

Unit- V

Java Servlets : Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server Pages (JSP).

III YEAR

WEB TECHNOLOGY (C-146)

Unit-I

History of the web, Growth of the Web, Protocols governing the web, Introduction to Cyber Laws in India, Introduction to International Cyber laws, Web project, Web Team, Team dynamics.

Unit-II

Communication Issues, the Client, Multi-departmental & Large scale Websites, Quality Assurance and testing, Technological advances and Impact on Web Teams.

Unit-III

HTML : Formatting Tags, Links, List, Tables, Frames, forms, Comments in HTML, DHTML. **JavaScript** : Introduction, Documents, Documents, forms, Statements, functions, objects in JavaScript, Events and Event Handling, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.

Unit IV

XML : Introduction, Displaying an XML Document, Data Interchange with an XML document, Document type definitions, Parsers using XML, Client-side usage, Server Side usage.

Unit V

Common Gateway Interface (CGI), PERL, RMI, COM/DCOM, VBScript, Active Server Pages (ASP).

SOFTWARE ENGINEERING (C-140)

Unit-I Introduction : Introduction to software engineering, Importance of software, The evolving role of software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software engineering problems, Software Development Life Cycle, Software Process.

Unit-II Software Requirement Specification : Analysis Principles, Water Fall Model, The Incremental Model, Prototyping, Spiral Model, Role of management in software development, Role of matrices and Measurement, Problem Analysis, Requirement specification, Monitoring and Control.

Software-Design : Design principles, problem partitioning, abstraction, top down and bottom up-design, Structured approach, functional versus object oriented approach, design specifications and verification, Monitoring and control, Cohesiveness, coupling, Forth generation techniques, Functional independence, Software Architecture, Transaction and Transform Mapping, Component – level Design, Forth Generation Techniques.

Unit-III Coding : Top-Down and Bottom –Up programming, structured programming, information hiding, programming style and internal documentation.

Testing : Testing principles, Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, software testing strategies, Verification & validation, Unit testing, Integration Testing, Alpha & Beta testing, system testing and debugging.

Unit-IV Software Project Management : The Management spectrum- (The people, the product, the process, the project), cost estimation, project scheduling, staffing, software configuration management, Structured Vs. Unstructured maintenance, quality assurance, project monitoring, risk management.

Unit-V Software Reliability & Quality Assurance : Reliability issues, Reliability metrics, Reliability growth modeling, Software quality, ISO 9000 certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM.

CASE (Computer Aided Software Engineering) : CASE and its Scope, CASE support in software life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

.NET FRAMEWORK & C# (C-139)

Unit-I

The .NET framework : Introduction, Common Language Runtime, Common Type System, Common Language Specification, The Base Class Library, The .NET class library Intermediate language, Just-in-Time compilation, garbage collection, Application installation & Assemblies, Web Services, Unified classes.

Unit-II

C# Basics : Introduction, Data Types, Identifiers, variables & constants, C# statements, Object Oriented Concept, Object and Classes, Arrays and Strings, System Collections, Delegates and Events, Indexes Attributes, versioning.

Unit-III

C# Using Libraries : Namespace-System, Input Output, Multi-Threading, Networking and Sockets, Data Handling, Windows Forms, C# in Web application, Error Handling.

Unit-IV

Advanced Features Using C# : Web Services, Windows services, messaging, Reflection, COM and C#, Localization.

Unit-V

Advanced Features Using C# : Distributed Application in C#, XML and C#, Unsafe Mode, Graphical Device Interface with C#,
Case Study (Messenger Application)

DATA MINING & WAREHOUSING (C-141)

Unit – I

Dss-Uses, definition, Operational Database. Introduction to DATA Warehousing. Data-Mart, Concept of Data-Warehousing, Multi Dimensional Database Structures. Client/Server Computing Model & Data Warehousing. Parallel Processors & Cluster Systems. Distributed DBMS implementations.

Unit – II

DATA Warehousing. Data Warehousing Components. Building a Data Warehouse. Warehouse Database. Mapping the Data Warehouse to a Multiprocessor Architecture. DBMS Schemas for Decision Support. Data Extraction, Cleanup & Transformation Tools. Metadata.

Unit – III

Business Analysis. Reporting & Query Tools & Applications. On line Analytical Processing(OLAP). Patterns & Models. Statistics. Artificial Intelligence.

Unit – IV

Knowledge Discovery, Data Mining. Introduction to Data-Mining. Techniques of Data-Mining. Decision Trees. Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms. Rule Introduction. Selecting & Using the Right Technique.

Unit – V

Multimedia Data-Mining, Multimedia-Databases, Mining Multimedia Data, Data-Mining and the World Wide Web, Web Data-Mining, Mining and Meta-Data. Data Visualization & Overall Perspective. Data Visualization. Applications of Data-Mining.

ARTIFICIAL INTELLIGENCE (C-142)

- 1. AI and its importance :** History of AI application areas, problem representation, State space representation, problem-reduction representation, productions system.
- 2. Logics :** Propositional logic syntax and semantics. First order predicate logic (FOPL). Syntax and semantics conversion to clausal form inference rules unification and the resolution principle.
- 3. Structure knowledge :** Associative networks. Frame structures. Conceptual dependencies and scripts.
- 4. Object-oriented representation :** Overview of object oriented systems, objects classes, message and methods.
- 5. Rule base knowledge representation :** Procedural and declarative knowledge, forward and backward reasoning matching control knowledge.
- 6. Search and control strategies :** Data drive and goal drive search. Uninformed search, depth first and breadth first search, heuristic search, admissibility, monotonicity and informedness, using heuristic in games.
- 7. Learning :** Type of learning. Learning a induction, failure-drive learning being told learning exploration.
- 8. Expert system :** Architecture, Rule based architecture, Non-production system architecture, Stages of expert system development, Expert system applications, Knowledge acquisition and validation, Knowledge system build in tolls.

NEURAL NETWORKS (C-143)

Unit-I-Introduction

- What is a Neural Network ?
- Historical Background
- Human Brain Working Levels
- Human Brain
- Learning Process in Human Brain
- Properties of Biological Neuron
- Models of Neuron
- Different Types of Functions
- Neural Networks Viewed as Directed Graphs
- Knowledge Representation
- Artificial Intelligence and Neural Networks
- Comparison Between Biological and Artificial Neural Networks

Unit-II-Learning Process

- Error Correction Learning
- Memory Based Learning
- Hebbian Learning Rule
- The Boltzmann Machine
- Competitive Learning
- Credit Assignment Problem
- Memory
- Adaptation
- Statistical Nature of Learning Process

Unit-III-Single Layer Perceptrons

- Adaptive Filtering Problem
- Unconstrained Optimization Techniques
- Linear Least Square Filters
- Least Mean Square Algorithm
- Learning Curves
- Learning Rate Annealing Techniques
- Perceptrons
- Perceptron Convergence Theorem
- Relation Between the Perceptron and Bayes Classifier for a Gaussian Environment

Unit-IV-Multi-Layer Perceptrons

- Multi-Layer Perceptron
- Back Propagation Network
- Back Propagation Algorithm
- Back Propagation Learning Algorithm
- The XOR Problem
- Heuristics for Making Back Propagation Better
- Output Representation and Decision Rule in Multi-Layer Perceptron
- Computer Experiment

Unit-V-Back Propagation

- Back Propagation and Differentiation
- Hessian Matrix
- Generalization
- Cross Validation
- Network Pruning Techniques
- Virtues and Limitations of Back Propagation Learning
- Accelerated Convergence
- Supervised Learning Viewed as an Optimization Problem

Unit-VI-Self-Organization Maps

- Topology Preserving Maps in the Brain
- Two Basic Feature-Mapping Models
- Self-Organization Map
- Som Algorithm
- Properties of the Feature Map
- Computer Simulations
- Learning Vector Quantization (LVQ)
- Adaptive Pattern Classification
- Adaptive Resonance Theory

Unit-VII-Neuro Dynamics

- Dynamical Systems
- Stability of Equilibrium States
- Attractors
- Neuro Dynamical Model
- Manipulation of Attractors as a Recurrent Network Paradigm

Unit-VIII-Hopfield Models

- Hopfield Networks
- Hopfield Model

- Convergence Proof
- Relation Between the Stable States of the Discrete and Continuous Versions of Hopfield Model
- Learning Process of the Hopfield Model
- The Discrete Hopfield Model as a Content Addressable Memory
- Computer Experiment
- Associative Memory
- Bidirectional Associative Memory (BAM)

COMPUTER GRAPHICS & ANIMATION (C-134)

Unit-I-Graphics Primitives, Input Devices and Techniques

- Graphics Primitives
- Display Devices
- Input Devices
- Input Techniques
- Pointing and Selection

Unit-II-Mathematics for Computer Graphics and Its Operations

- Mathematics for Computer Graphics
- Point Representation
- Vector Representation
- Matrices and Operation Related to Matrices
- Vector Addition and Subtraction
- Vector Multiplication
- Line Drawing Algorithms
- Segment and Display Files
- Graphic Operations
- Filling

Unit-III-Conics, Curves and Surface

- Conics, Curves
- Quadric Surfaces
- Super quadrics
- Spline and Bezier Representations

Unit-IV-Transformation and Graphics

- Transformation
- 2D Transformation
- Basic Transformation
- Composite Transformations
- 3D Graphics
- 3D-Transformatio
- Parallel Projection
- Perspective Projection
- Visible Lines and Surfaces Identification
- Hidden Surface Removal

Unit-V-Animation

- Computer Animation
- Principles of Animation
- Types of Animation
- Types of Animation Systems
- Animation Tools
- Software
- GIF Animator
- GKS
- GKS Workstation and Metafiles

MULTIMEDIA SYSTEM (C-135)

Unit I

Evolution of Multimedia and its objects, Scope of multimedia in business & work, Production and planning of Multimedia applications. Multimedia hardware, Memory & Storage Devices, Communication Devices, Multimedia Software, Presentation and object generation tools, Video, sound, Image capturing, Authoring Tools, Card & Page Based Authoring Tools.

Unit II

Production and Planning of Multimedia building blocks, Text, sound (MIDI), Digital Audio, Audio File Formats, MIDI under Windows environment, Audio & Video Capture.

Unit III

Macromedia products, Basic drawing techniques, Advance animation techniques, Creating multi layer combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.

Unit IV

Digital Audio Concepts, Sampling variables, Loss Less compression of sound, Lossy compression & Silence compression.

Unit V

Multimedia monitor bitmaps, Vector drawing, Lossy graphic compression, Image file formatic animations Image standards, J P E G compression, Zig Zag coding, Video representation, colors, video compression, MPEG standards, MHEG standard, recent development in multimedia. Multimedia Application Planning, Costing, Proposal preparation, and Financing-Case study of a typical industry.

MOBILE COMPUTING (C-144)

Unit I

Issues in Mobile Computing, Wireless Telephony, Digital Cellular Standards, Bluetooth Technology, Wireless Multiple Access Protocols, Channel Allocation in Cellular Systems.

Unit II

Data Management Issues: Mobility, Wireless Communication and Portability, Data Replication and Replication Schemes, Basic Concept of Multihopping, Adaptive Clustering for Mobile Network, Multicluster Architecture.

Unit III

Location Management, Location Based Services, Automatically Locating Mobile Users, Locating and Organizing Services, Issues and Future Directions, Mobile IP, Comparison of TCP and Wireless.

Unit IV

Transaction Management, Data Dissemination, Cache Consistency, Mobile Transaction Processing, Mobile Database Research Directions, Security Fault Tolerance for Mobile N/W.

Unit V

What is Ad-hoc Network? , Problems with Message Routing in Wireless Ad-hoc Mobile Networks, Routing scheme based on signal strength, Dynamic State Routing (DSR), Route Maintenance and Routing error, Fisheye Routing (FSR), Ad-hoc on Demand Distance Vector (ADDV).

ERP SYSTEM (C-145)

Unit-I

Enterprise wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems, Common myths and evolving realities, ERP and Related Technologies, Business Process Reengineering and Information Technology, Supply Chain Management, Relevance to Data Warehousing, Data Mining and OLAP, ERP Drivers, Decision support system.

Unit-II

ERP Domain, ERP Benefits classification, Present global and Indian market scenario, milestones and pitfalls, Forecast, Market players and profiles, Evaluation criterion for ERP product, ERP Life Cycle: Adoption decision, Acquisition, Implementation, Use & Maintenance, Evolution and Retirement phases, ERP Modules.

Unit- III

Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendors evaluation criterion, ERP Implementation approaches and methodology, ERP implementation strategies, ERP Customization, ERP-A manufacturing Perspective.

Unit- IV

Critical success and failure factors for implementation, Model for improving ERP effectiveness, ROI of ERP implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations.

Unit- V

Technologies in ERP Systems and Extended ERP, Case Studies Development and Analysis of ERP Implementations in focusing the various issues discussed in above units through Soft System approaches or qualitative Analysis tools, Learning and Emerging Issues, ERP and E-Commerce.