MCA I YEAR I SEMESTER:

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	M A R K S			Credits
			Internal	External	Total	
MCA111	Problem Solving and Computer Programming	T (4)	20	80	100	4
MCA112	Computer Organization	T (4)	20	80	100	4
MCA113	Discrete Mathematical Structures	T (4)	20	80	100	4
MCA114	Internet Technologies	T (4)	20	80	100	4
MCA115	Managerial Economics	T (4)	20	80	100	4
MCA116	Problem Solving and Computer Programming Laboratory	L (4)	--	50	50	2
MCA117	Internet Technologies Laboratory	L (4)	--	50	50	2
MCA118	Open Source Laboratory	L (4)	--	50	50	2
Grand total (marks and credits)					650	26

MCA111	**PROBLEM SOLVING AND COMPUTER PROGRAMMING**	**PSCP**
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T – I

INTRODUCTION TO COMPUTERS: Computers - History, Generations/Evolution, Types; Computer Hardware and Software. PROGRAMMING TECHNIQUES: Problem solving aspects (Definition & understanding a problem, algorithm, flowchart, Pseudo Code). Compilation process (Source code, Object code, executable code).Type of Software. Evolution of Programming languages. Various programming techniques (monolithic, structured programming, OOP)

INTRODUCTION TO OOP – Overview of C++, C++ programs, Data types, variables, constants, coding constants, expression precedence and associatively, mixed type expressions. OPERATOR's. Class, structures, union, friend functions, friend classes, inline functions, constructors, destructors, static members, scope resolution operator, passing objects to functions, function returning objects. FUNCTIONS: Functions in C++, User defined functions, standard library functions, and scope.

U N I T – II

SELECTION MAKING DECISIONS: Two-way selection, multi-way Selection.RPETETION: Concept of a loop, event –controlled and counter-controlled loops, loops in C++, recursion. TEXT I/O: Input O/P entities, Streams, Formatting input and output, character input/output Functions, character input/output examples. ARRAYS: Arrays and functions, array application sorting, searching. POINTERS: Pointers and functions, pointers to pointers, pointer arithmetic and arrays, passing an array to a function.

U N I T – III

CLASSES- Class objects, inline functions, static members, classes and pointers, structure, unions, enumerated types, the type definition. INHERITANCE AND AGGREGATION: Inheritance, private, protected, public, manager functions and inheritance, overriding member functions, polymorphism, multiple inheritance. Operator overloading, Member operator function, friend operator function, overloading special operators like [ ], ( ), comma operator, inheritance, types of inheritance, protected members, virtual base class, polymorphism, virtual functions, pure virtual functions.

U N I T – IV

CLASS templates and generic classes, function templates strings and generic functions, overloading a function templates, power of templates, Exception handling, Derived class exception, over handling generic function, exception handling functions, terminate(),unexpected(),uncaught(),exception(). EXCEPTION HANDLING: Exception handling classes, exception specification, exception in classes, standard exception. STREAMS, formatting I/O with class functions and manipulators, creating own manipulator, overloading << and >>, File I/ O, header files, conversion functions, array based I /O, Standard Template Library (STL).

TEXT BOOK:
- R.G. Dromey, "HOW TO SOLVE IT BY COMPUTER", PHI.
- A STRUCTURED APPROACH USING C++ BY B.A.FOROUZAN & RF GILBERG (THOMSON BUSINESS INFORMATION INDIA)
- Herbert Schilbt, C++ - The Complete Reference, TMH 2002
- J.P. Cohoon and J.W. Davidson, C++ program design – An Introduction To Programming and Object Oriented Design.- MGH 1999.

MCA112	COMPUTER ORGANIZATION	CO
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T - I

LOGIC CIRCUITS:Basic Logic Functions, Synthesis of Logic Functions Using ADN, OR, and NOT Gates, Minimization of Logic Expression, Synthesis with NAND and NOR Gates, Practical Implementation of Logic Gates, Flip-Flops, Registersand Shift Registers, Counters, Decoders, Multiplexers, Programmable Logic Devices (PHDs), Field-Programmable Gate Arrays, Sequential Circuits. BASIC STRUCTURE OF COMPUTER HARDWARE AND SOFTWARE: Functional units, Basic operational concepts, Bus structures, Software, Performance, Distributed Computing. ADDRESSING METHODS : Basic Concepts, Memory Locations, Main Memory Operations, Addressing Modes, Assembly Language, Basic I/O operations, Stacks and Queues, Subroutines. (Chapter 1, 2.1 to 2.8, A.1 to A.13)

U N I T - II

PROCESSING UNIT: Some Fundamental Concepts, Execution of a Complete Instruction, Hardwired Control, Performance Considerations, Micro Programmed Control, Signed Addition and Subtraction, Arithmetic and Branching Conditions, Multiplication of Positive Numbers, Signed-Operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.
        (Chapter 3, 6.4 to 6.10)

U N I T - III

INPUT-OUTPUT ORGANIZATION: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, I/O Hardware, Standard I/O Interfaces, The Motorola 680X0 Family, The Intel 80X86 Family, The Power PC Family, The Alpha AXP Family, Architectural and Performance Comparisons, A Stack Processor.   (Chapter 4, 8.1 to 8.6)

U N I T - IV

MEMORY: Semiconductor RAM memories, Read-Only Memories, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements.
INTRODUCTION TO COMPUTER PERIPHERALS: I/O Devices, On-Line Storage. (Chapter 5, 9.1, 9.2)

TEXT BOOK

1. COMPUTER ORGANIZATION, TMH (IV EDITION) BY V.C. HAMACHER

REFERENCE BOOK

1. COMPUTER ORGANIZATION, (PHI) By MORIS MANO
2. COMPUTER ARCHITECTURE & ORGANISATION By HAYES, (TMH)
3. COMPUTER SYSTEMS ORGANISATION & ARCHITECTURE By.ARPINELLI,(ADDISON
    WESLEY)
4. THE ARCHITECTURE OF COMPUTER HARDWARE AND SYTEMS HARDWARE BY I ENGLANDER (WILEY)
5. COMPUTER SYTEMS DESIGN AND ARCHITECTURE BY VP HEURING, HF JORDAN (PEARSON)

MCA113	Discrete Mathematical Structures	DM

WORK LOAD: 4 PPW	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

U N I T - I

FUNDAMENTALS: Sets, Relations and functions, Fundamental of logic, Logical inferences, First order logic, Quantified propositions, Mathematical induction

ELEMENTARY COMBINATORICS: Combinations and Permutations, Enumeration Repetitions, with constrained repetitions, The Principle of Inclusion-Exclusion.(Chapters 1-2)

U N I T -II

RECURRENCE RELATIONS: Generating functions, Coefficients of Generating functions, Recurrence Relations, Inhomogeneous Recurrence Relations (Chapter-3)

U N I T - III

RELATIONS AND DIAGRAMS: Relations and diagrams, Binary relations, Equivalence relations, Ordering relations, Lattices, Paths and Closures, Directed graphs, Adjacency matrices-Applications, Sorting and Searching (Chapter - 4)

U N I T - IV

GRAPHS: Graphs, Isomorphism, Trees, Spanning trees, Binary trees, Planar graphs, Euler'sCircuits, Hamiltonian graphs, Chromatic numbers, Four-color problem, Network flows (Chapter 5)

TEXT-BOOK:

1. DISCRETE MATHEMATICS FOR COMPUTER SCIENTISTS, BY - J L MOTT, A KANDEL AND T PBAKER

REFERENCE BOOKS:

1. DISCRETE MATHEMATICAL STRUCTURE - (TMH) BY - TREMBLEY AND MANOHAR
2. DISCRETE MATHEMATICS WITH ALGORITHMS - (JOHN WILEY) BY - M.O. ALBERTSON AND J.P.HUTCHINSON
3. ELEMENTS OF DISCRETE MATHEMATICS-(TMH, SECOND EDITION) BY - C.L.LIU
4. DISCRETE MATHEMATICS - (PHI, THIRD EDITION) BY - BURNORD KOLMAN
5. DISCRETE MATHEMATICS BY KH ROSSEN (TMH)
6. DISCRETE MATHEMATICS BY S LIPSCHUTZ AND M. LIPSON SCHAUM'S SERIES (TMH)
7. DISCRETE MATHEMATICS FOR COMPUTER SCIENCE BY GARRRY HAGGARD, J. SCHILPF&S WHITE SIDES (THOMSON PRESS)
8. DISCRETE &COMBINATORIAL MATHEMATICS BY RALPH P GRIMALDI(PEARSON EDUCATION)
9. DISCRETE MATHEMATICAL STRUCTURES BY DS MALLIK & M K SEN (THOMSON PRESS)

MCA114	INTERNET TECHNOLOGIES	IT
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

UNIT – I

WORLD WIDE WEB–History, Evolution, Web Terminology, Web Application Introduction. Difference between Client Side and Server Side Application Deployment.HTML- Basic HTML Tags, The document body, Text, Hyperlinks, Adding More Formatting, Lists, Using Color and Images, Images, Tables, MORE HTML- Multimedia Objects Frames, Forms-Toward Interactivity. CASCADING STYLE SHEETS – Introduction, using Inline Styles, Sample Examples, Defining Your Own Styles; Properties in Values in Styles; Style sheets A worked example; Formatting Blocks of Information; Layers; Embedded Style Sheets, Linking external sheets;

UNIT – II

INTRODUCTION TO JAVASCRIPT- JavaScript, Basics, Variables, Statements, Obtaining User Input with prompt dialog boxes, Operators (arithmetic, Decision making, assignment, logical, increment and decrement);CONTROL STRUCTURES - if… else selection statement, while, do… while repetitions statement, for statement, switch statement, break and continue statements.
FUNCTIONS – function definition; User defined functions; program modules in JavaScript; scope rules, global functions, Random-number generator; Recursion; OBJECTS IN JAVA SCRIPT – Math Object, String Object, Date Object, Boolean and Number Object, document and window Objects. EVENTS - onclick, onchange, onload, onerror, onmouseover, onmouseout, onselect, onfocus, onblur, onsubmit, onunload etc.,

UNIT – III

DHTML- Introduction, FILTER AND TRANSITIONS – Flip Filters: fliph and flipv; Transparency with the chroma Filter; Creating Image masks; Miscellaneous Image Filters: invert, gray and xray; Adding shadows to Text; Creating slope with alpha Filter; Making Text glow; Creating Motion with blur; Using the wave Filter; Advanced Filters: drop Shadow and light;blendTrans Transition;revealTrans Transition. ACTIVE SERVER PAGES- Introduction, Sample ASP Example; ASP Objects; Request Object; Response Object; Server Object; Session Object; Application Object; Sample database programming using ODBC.

UNIT – IV

PHP – Introduction to PHP, including PHP in a page, Data Types, program control, Arrays, User-defined functions, Built-in Functions, regular expression, using files. Building Web Applications with PHP-tracking users, using database programming with MySQL. XML - Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions (DTDs), W3C XML Schema Documents, XML Vocabularies, MathML, Other Markup Languages, Extensible Style sheet Language and XSL Transformations, Document Object Model (DOM).

TEXT BOOKS

1. Web Programming –Chris Bates – Third Edition.(Wiley)
2. Internet & World Wide Web- H. M. Deitel, P.J. Deitel, A. B. Goldberg-Third Edition

MCA115	MANAGERIAL ECONOMICS	ME
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T - I

INTRODUCTION: Nature and Scope of Managerial Economics - Fundamental Concepts used in Managerial Economics - Methods of Economic Analysis for Managerial Decision Making - Objectives of a firm - Profit Maximization VS Wealth Maximization.

U N I T - II

CONSUMER BEHAVIOR AND DEMAND ANALYSIS: The theory of consumer behavior - Concept of utility - Marginal utility Analysis - Consumer surplus - Indifference curve analysis. Concept of demand - Law of demand - Demand determinants - Elasticity of demand - Types -Measurement of elasticity of demand - Types - Measurement of Elasticity of demand - Demand forecasting.

U N I T - III

PRODUCTION ANALYSIS: Laws of Production - The production function - ISO cost and ISO quant curves - Equilibrium of the firm and industry - Choice of optimal combination of factors of production - Choice of optimal expansion path - The law of supply - Derivation of supply curve – Market analysis - Pricing under various competitive situations.

U N I T - IV

National income analysis/ Measurement/ Growth rates Indian economy, Planning and development in India - Development strategies - Five Year Plans - Poverty - Food & Population problems. Break even Analysis.

TEXT BOOKS

1. MANAGERIAL ECONOMICS (UNIT - I, II, III) BY VARSHNEY & MAHESHWARI

2. INDIAN ECONOMY - (UNIT - IV) BY MISHRA & PURI

MCA116	PROBLEM SOLVING AND COMPUTER PROGRAMMING Laboratory	PSPL
WORK LOAD: 4 PPW	ASSIGNMENTS ASSESSMENT	EXTERNAL MARKS: 50

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

MCA117	INTERNET TECHNOLOGY Laboratory	ITL
WORK LOAD: 4 PPW	ASSIGNMENTS ASSESSMENT	EXTERNAL MARKS: 50

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

MCA118	OPEN SOURCE Laboratory	PCSL
WORK LOAD: 4 PPW	ASSIGNMENTS ASSESSMENT	EXTERNAL MARKS: 50

PC Hardware and Software Introduces the students to a personal computer / laptops and its basic peripherals, the process of assembling a personal computer, installation of system software like DOS, FOSS -Linux / Ubuntu and the required device drivers and how it should be configured. In addition hardware and software level troubleshooting process, tips and tricks would be covered. Usage of web browsers, e-mail. Office Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations. (Recommended to use Open / Libra /Star Office)

MCA I YEAR II SEMESTER:

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA121	Data Structures	T (4)	20	80	100	4
MCA122	Object Oriented Programming	T (4)	20	80	100	4
MCA123	System Software	T (4)	20	80	100	4
MCA124	Operating System	T (4)	20	80	100	4
MCA125	Probability and Statistical Methods	T (4)	20	80	100	4
MCA126	Data Structures Laboratory	L (4)	--	50	50	2
MCA127	Object Oriented Programming Laboratory	L (4)	--	50	50	2
MCA128	Operating System & System Software Laboratory	L (4)	--	50	50	2
Grand total (marks and credits)					**650**	**26**

MCA121	**DATA STRUCTURES**	**DS**
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

UNIT – I

INTRODUCTION: The Abstract Data Type – A Model for an Abstract Data Type – Algorithm Efficiency. SEARCHING: List Searches – C ++ Search Algorithms – Hashed List Searches – Collision Resolution. LINKED LISTS: Linear List Concepts – Linked List Concepts – Linked List Algorithms – Processing a Linked List – Circularly Linked Lists – Doubly Linked Lists – List Abstract Data Type-Linked List Implementation. STACKS: Basic Stack Operations – Stack Linked List Implementation – Stack Applications – Stack ADT–Array Implementation. (Chapters 1,2, 3.4)

U N I T – II

QUEUES: Queue Operations – Queue Linked List Design – Queue Applications – Queue ADT-Linked List Implementation – Queue ADT-Array Implementation. RECURSION: Designing Recursive Algorithms – The Towers of Hanoi – C ++ Implementations of Recursion. INTRODUCTION TO TREES: Binary Trees – Binary Tree Traversals – Expression Trees – General Trees. SEARCH TREES: Binary Search Trees.AVL Trees and their implementation (Chapters 5 to 8,)

U N I T – III

HEAPS: Heap Definition – Heap Structure – Basic Heap Algorithms – Heap Data Structure – Heap Algorithms – Heap Applications.MULTIWAY TREES: m-way Search Trees – implified B-Trees-B tree Variations. ADVANCED SORTING CONCEPTS: General Sort Concepts – Insertion Sorts – Selection Sorts – Exchange Sorts – External Sorts. GRAPHS: Operations – Graph Storage Structures – Graph Algorithms. (Chapters 9, 10, 11, 12 of 1st Text Book)

U N I T – IV

ALGORITHM DESIGN TECHNIQUES: Greedy Algorithms — Divide and Conquer –Dynamic Programming — Ordering Matrix Multiplications – Backtracking Algorithms (Chapters 10.1, 10.2, 10.3, 10.5, of 2nd Text Book)

TEXT BOOKS

1 DATA STRUCTURES A PSEUDOCODE APPROACH WITH C ++ BY – RICHARD F. GILBERG. BEHROUZ A. FOROUZAN (THOMSON PRESS)
2 DATA STRUCTURES & ALGORITHM ANALYSIS IN C ++ BY – MARK ALLEN WEISS.

MCA122	Object Oriented Programming	OWJ
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

UNIT I
Java Fundamentals- Introducing Data Types and Operators- Program Control Statements (Chapters 1, 2, 3)

UNIT II
Introducing Classes, Objects and Methods-Arrays, Irregular Arrays- A Closer Look at Methods and Classes- Inheritance (Chapters 4, 5, 6, 7)

UNIT III
Packages and Interfaces – Exception Handling – Multithreaded Programming – Enumerations, Autoboxing, Static Import and Annotations (Chapters 8, 9, 11, 12)

UNIT IV
Using I/O- Applets, Events and Miscellaneous Topics – Introducing Swings (Chapters 10, 14, 15)

TEXT BOOK:
    1.   Java A Beginner's Guide, Fifth Edition, Tata McGRAW-HILL
References
    1.   Beginning Java, Java 7th Edition, Ivor Horton's, Wiley India Edition.
    2. Java the Complete Reference 8th Edition, Herbert Schildt, Tata McGrawHill Edition.

MCA123	SYSTEM SOFTWARE	SS
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T – I

SYSTEMS PROGRAMMING**:** Assemblers Overview – Global Structure, .Stack Segment, .Data Segment, .Code Segment, Arithmetic – Addition, Subtraction, Multiplication, Division, Comments. Comparing and Branching – Decision making in Assembly, Unsigned Conditional jumps, Flags, Loops, Reading single characters, Sub programs-procedures, Macros – Declarations, Expansion, Parameters, Local Symbols, Parameter Separator, Assembly Listing.

(Chapters 2,4,5,6,7,8 text book2)

U N I T – II

BACKGROUND: Introduction, System Software and Machine Architecture, The Simplified Instructional Computer (SIC), SIC Machine Architecture, SIC/XE Machine Architecture, Traditional (CISC) Machines, VAX Architecture, Pentium Pro Architecture
ASSEMBLERS: Basic Assembler Functions, A Simple SIC Assembler, Assembler Algorithm and Data Structures, Machine-Dependent Assembler Features, Instruction Formats and Addressing Modes, Program Relocation, Machine-independent Assembler Feature, Literals, Symbol-Defining Statements, Expressions, Program Blocks, Control Sections and Program Linking, Assemblers Design Options, One-Pass Assemblers, Multi-Pass Assemblers,

(Chapters 1, 2 of text book1)

U N I T – III

LOADERS AND LINKERS: Basic Loader Functions, Design of an Absolute Loader, A Simple Bootstrap Loader, Machine-Dependent Loader Features, Relocation, Program Linking, Algorithm and Data Structures for a Linking Loader, Machine-Independent Loader Features, Automatic Library Search, Loader Options, Loader Design Options, Linkage Editors, Dynamic Linking, Bootstrap Loaders,
MACRO PROCESSOR: Basic Macro processor Functions, Macro Definition and Expansion, Macro Processor Algorithm and Data Structures, Machine-Independent Macro Processor Features, Concatenation of Macro Parameters, Generation of Unique Labels, Conditional Macro Expansion, Keyword Macro Parameters, Macro Processor Design Options.

(Chapters 3,4 of text book1)

U N I T – IV

COMPILERS: Compiler Functions: Grammars, Lexical Analysis, Syntactic Analysis, Code Generation, Machine-Dependent Compiler Features: Intermediate Form of the Program, Machine-Dependent Code Optimization, Machine-Independent Compiler Features: Structured Variables, Machine-Independent Code Optimization, Storage Allocation, Block-Structured Languages, Compiler Design Options: Division into Passes, Interpreters, P-Code compilers, Compiler-Compilers.   (Chapters 4, 5 of text book 1)

TEXT-BOOK
1. SYSTEM SOFTWARE AN INTRODUCTION TO SYSTEMS PROGRAMMING -By LELAND L. BECK

2. ASSEMBLY LANGUAGE PROGRAMMING FOR THE IBM PC FAMILY- WILLIAM B JONES (DREAMTECH)

MCA124	OPERATING SYSTEMS	OS
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T - I

INTRODUCTION: What is an Operating Systems?, Mainframe Systems, Desktop Systems, Distributed Systems, Real-Time Systems, Handheld Systems, Feature Migration, Computing Environments. COMPUTER-SYSTEM STRUCTURES: Computer-System Operation, I/O Structure, Storage Structure, Hardware protection, Network Structure. OPERATING SYSTEM STRUCTURE: System Components, Operating System Services, System Calls, System Programs, System Structure, Virtual Machines, System Design and Implementation. PROCESSES: Process Concept, Process Scheduling, Operations on Processes, Cooperating Processes, Inter process Communication, communication in Client-Server Systems. Multithreading concepts, Multithreading Models, Java Threads. (Chapters 1, 2, 3, 4 and 5)

U N I T - II

CPU SCHEDULING: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Process Scheduling Models.
PROCESS SYNCHRONIZATION: Background, The Critical-Section Problem, synchronization Hardware, Semaphores, Critical Regions, Monitors, OS Synchronization.
DEADLOCKS: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection.
 (Chapters 6, 7 and 8)

U N I T - III

MEMORY MANAGEMENT: Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation. VIRTUAL MEMORY: Background, Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing. FILE SYSTEM INTERFACE & IMPLEMENTATION: File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing, File-system Implementation, Directory Implementation, Allocation Methods, Free-Space Management, and Recovery.
        (Chapters 9, 10, 11 and 12)

U N I T - IV

MASS-STORAGE STRUCTURE: Disk Structure, Disk Scheduling, Disk Management, Swap Space Management, RAID Structure, Disk Attachment, Stable-Storage Implementation. PROTECTION: Goals of Protection, Domain of Protection, Access Matrix, Implementation of access Matrix, Revocation of Access Rights, Capability-Based Systems. (Chapters 14 and 18)

TEXT BOOKS
1. OPERATING SYSTEM CONCEPTS (6th Edition) By - SILBERSCHATZ, GALVIN, GAGNE Jhon-Wiley (2002)

REFERENCE BOOKS
1. OPERATING SYSTEMS (IV Edition) By - William Stallings PHI (2002)
2. OPERATING SYSTEMS By - GARY NUTT (Pearson Education)
3. OPERATING SYSTEMS By - CHARLES CROWLEY TMH (2000)
4. MODERN OPERATING SYSTEMS By - A.S. TANENBAUM (PHI) (2002)
5. OPERATING SYSTEMS BY – DM DHAMDHERE (TMH)
6. UNDER STANDING OPERATING SYSTEMS BY – IM FLYNN, AM MCHOCS (THOMSON PRESS)
7. OPERATING SYTEMS – DIETEL (PEARSON)

MCA125	**PROBABILITY AND STATISTICAL METHODS**	**PSM**
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T - I
INTRODUCTION TO STATISTICS: Data Collection and Tabulation, Graphical Representation of Data Measures of Central Tendency and Dispersion, Moments, Skewness and Kurtosis. PROBABILITY: Basic Concepts and Terms, Probability Distribution Functions: Uniform, Binomial, Poisson, Mathematical Expectation, Normal and X2 Distributions.

U N I T - II
CORRELATION AND REGRESSION: Correlation Coefficient, Bivariate Correlation, Karl Pearsons Formula, Rank Correlation, Regression. Linear Regression Equations, Regression Coefficient - Multiple-Correlation. Analysis of Variance and Regression Analysis.

U N I T - III
TESTING OF STATISTICAL HYPOTHESIS: X2 Tests for Variance, Tests for Mean of a Single Sample, Two Sample Means some tests based on F Distribution.

U N I T - IV
ANALYSIS OF VARIANCE: One Way Classification, Two Way Classification, Statistical Analysis of Data.

TEXT BOOK
> 1. FUNDAMENTALS OF APPLIED STATISTICS – BY - GUPTA AND KAPOOR

REFERENCE BOOKS
> 1. FUNDAMENTAL OF MATHEMATICAL STATISTICS BY - V K KAPOOR AND GUPTA SC
> 2. STATISTICS (PHI) BY - FREUD
> 3. PROGABILITY STATISTICS AND RANDOM PROCESS BY - R VEERA RAJAN (TMH)
> 4. INTRODUCTION TO PROBABILITY & STATISTICS BY - J.S. MILTON & JC ARNOLD (TMH)
> 5. MILLER & FERUNDS PROBABILITY & STATISTICS FRO ENGINNER BY - JOHNSON (PEARSON)
> 6. PROBABILITY & STATISTICS FRO ENGINEERS & STATISTICSTS BY - WALPOSE (PEARSON)

MCA126	DATA STRUCTURES Laboratory	DSL
WORK LOAD: 4 PPW	ASSIGNMENTS ASSESSMENT	EXTERNAL MARKS: 50

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

MCA127	OBJECT ORIENTED PROGRAMMING Laboratory	OWJL
WORK LOAD: 4 PPW	ASSIGNMENTS ASSESSMENT	EXTERNAL MARKS: 50

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

MCA128	OPERATING SYSTEM AND SYSTEM SOFTWARE Laboratory	OS&SSL
WORK LOAD: 4 PPW	ASSIGNMENTS ASSESSMENT	EXTERNAL MARKS: 50

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

MCA II YEAR I SEMESTER:

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA211	Database Management Systems	T (4)	20	80	100	4
MCA212	Data Communication and Networks	T (4)	20	80	100	4
MCA213	Software Engineering	T (4)	20	80	100	4
MCA214	Principles and Practices of Management	T (4)	20	80	100	4
MCA215	.NET Programming	T (4)	20	80	100	4
MCA216	Database Management Systems Laboratory	L (4)	--	50	50	2
MCA217	Software Engineering Laboratory	L (4)	--	50	50	2
MCA218	.NET Programming Laboratory	L (4)	--	50	50	2
Grand total (marks and credits)					650	26

U N I T – I
FUNDAMENTALS OF DATABASE CONCEPTS: Database and Database Users: Characteristics of the Database Approach – Advantages of Using the DBMS Approach – A Brief History of Database Applications. Database System Concepts and Architecture: Data Models, Schemas, and Instances – Three Schema Architecture and Data Independence – Database Languages and Interfaces – The Database System Environment – Centralized and Client/Server Architectures for DBMSs – Classification of Database Management Systems. Data Modeling Using the Entity Relationship Model: Using High-Level Conceptual Data Models for Database Design – An Example Database Application – Entity Types, Entity Sets, Attributes, and Keys – Relationship Types, Relationship Sets, Roles, and Structural Constraints – Weak Entity Types – ER Diagrams, naming Conventions, and Design Issues. (Chapters 1 to 3)

U N I T – II
FUNDEAMENTALS OF RELATIONAL MODEL: The Relational Data Model and Relational Database Constraints: Relational Model Concepts – Relational Model Constraints and Relational Database Schemas. The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT – Relational Algebra Operations from Set Theory – Binary Relational Operations: JOIN and DIVISION – Additional Relational Operation – The Tuple Relational Calculus – The Domain Relational Calculus. Relational Database Design Using ER to Relational Mapping. (Chapters 5.1, 5.2, 6, 7.1)

U N I T – III
RELATIONAL DATABASE DESIGN: Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines for Relation Schemas – Functional Dependencies – Normal Forms Based on Primary Keys – General Definitions of Second and Third Normal Forms – Boyce-Codd Normal Form. Relational Database Design Algorithms and Further Dependencies: Properties of Relational Decompositions – Algorithms for Relational Database Schema Design – Join Dependencies and Fifth Normal Form. (Chapters 10 and 11)

U N I T – IV
FUNCTIONS OF DBMS: Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing – Transaction and System Concepts – Desirable Properties of Transactions – characterizing Schedules Based on Recoverability – Characterizing schedules Based on Serializability. Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control – Concurrency Control Based on Timestamp Ordering. Database Recovery Techniques: Recovery Concepts – Recovery Techniques Based on Deferred Update – Recovery Techniques Based on Immediate Update – Shadow paging. (Chapters 17.1 to 17.5, 18.1, 18.2, 19.1 to 19.4)

TEXT BOOKS
1. FUNDAMENTALS OF DATABASE SYSTEMS BY – RAMEZ ELMASRI SHAMKANT B. NAVATHE V EDITION (PEARSON)

REFERENCE BOOKS
1. DATABASE SYSTEM CONCEPTS (IV EDITION) BY - SILBER SCHATZ, KORTH G. SUDARSHAN (TMH)
2. DATABASE MANAGEMENT SYSTEMS BY - ALEXI'S LEON AND MATHEWS LEON (LION VIKAS -2002)
3. DATABASE MANAGEMENT SYSTEMS (II EDITION) - GERALD. V. POST
4. A FIRST COURSE IN DATABASE SYSTEMS - ULLMAN, WINDON (PEARSON)

MCA212	DATA COMMUNICATION AND NETWORKING	DCN
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

UNIT I

BASIC CONCEPTS: Line Configuration –Topology –Transmission Modes – Categories of Networks. THE OSI LAYERS– TCP/IP Protocol suite. TRANSMISSION OF DIGITAL DATA: INTERFACES AND MODEMS: Digital Data Transmission –DTE-DCE INTERFACE– Other interface– MODEMS– 56K Modems –Cable Modems. MULTIPLEXING: Many to One Downloading, Uploading/ One to Many – Frequency-Division Multiplexing(FDM) – wave Division Multiplexing(WDM) – Time Division Multiplexing(TDM) – Inverse Multiplexing – Multiplexing Application – Digital Subscriber Line(DSL) –FTTC in the Telephone Network, FTTC in the cable TV Network.   (Chapter 2, 3, 6 & 8)

UNIT II

ERROR DETECTION AND CORRECTION: Types of Errors –Redundancy – Vertical Redundancy check(VRC) – Longitudinal Redundancy Check(LRC) – Cyclic Redundancy Check(CRC) – Checksum – Error Correction – DATA LINK CONTROL: Line Discipline –Flow Control –Error Control. LOCAL AREA NETWORK: Project 802 – Ethernet – Other Ethernet Networks –Token Bus – Token Ring - FDDI. SWITCHING: Circuit Switching – Packet Switching – Message Switching.   (Chapter 9, 10, 12 and 14)

UNIT III

INTEGRATED SERVICES DIGITAL NETWORK (ISDN): Services –History – subscriber Access to the ISDN – The ISDN Layers – Broadband ISDN – Future of ISDN. X.25: X.25 Layers – Other Protocols related to X.25. NETWORKING AND INTERNETWORKING DEVICES: Repeaters – Bridges – Routers – Gateways – Other Devices –Routing algorithms – Distance Vector Routing – Link State Routing.   (Chapter 16, 17 and 21)

UNIT IV

TRANSPORT LAYER: Duties of Transport Layer – Connection — The OSI Transport Protocol. UPPER OSI LAYERS: Session layer – Presentation Layer – Application Layer. TCP/IP PROTOCOL SUITE: Overview of TCP/IP – Network Layer – Addressing –Subnetting –Other Protocols In the Network Layer –Transport Layer.   (Chapter 22, 23 and 24)

TEXT BOOK:

1. DATA COMMUNICATIONS AND NETWORKING BY BEHROUZ A. FOROUZAN (TATA McGraw Hill)

REFERENCE BOOKS

1. BUSINESS DATA COMMUNICATION & NETWORKS By - FITZ GERALD (John Wiley)
2. DATA & COMPUTER COMMUNICATIONS – W STALLINGS (PEARSON, PHI)
3. COMPUTER COMMUNICATIONS & NETWORKING TOPOLOGIES – MA GALLO, V.M. HANCOCK (THOMSON)
4. DATA COMMUNICATION & COMPUTER NETWORKS – R. AGARWAL, BB TIWARI (VIKAS)
5. COMPUTER NETWORKS – AS TANENBAUM (PHI)
6. COMPUTER NETWORKS – BLACK (PHI)
7. UNDER STANDING COMMUNICATIONS & NETWORKS – WA SHAY (THOMSON)
8. COMPUTER NETWORKING A TOP-DOWN APPROACH FEATURING THE INTERNET BY – JAMES F. KUROSE AND KEITH W. ROSS (PEARSON)

MCA213	SOFTWARE ENGINEERING	SE
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T - I

INTRODUCTION TO SOFTWARE ENGINEERING: The Evolving Role of Software - Software - The Changing Nature of Software - Software myths. A GENERIC VIEW OF PROCESS: Software Engineering-A Layered technology - A Process frame work - The capability Maturity Model Integration (CMMI) - Process Patterns - Process Assessment - Personal and Team Process Models - process Technology - Product and Process MODELS: Prescriptive Models - The waterfall Model - Incremental Process Models - Evolutionary Process Models - Specialized Process Models - The Unified Process. (Chapters1,2,3)

UNIT- II

SOFTWARE ENGINEERING PRACTICE: Software engineering Practice - Communication Practice - Planning Practices - Modeling Practices - Construction Practice - deployment   SYSTEM ENGINEERING: Compute-Based systems - The System Engineering Hierarchy - Business Process Engineering: An Overview - Product Engineering:An Overview - System Modeling. REQUIRMENT ENGINEERING: A Bridge to Design and Construction - Requirements Engineering Tasks - Initiating the Requirements Engineering Process - Eliciting Requirements - Developing Use - Cases - Building the analysis Model - Negotiating Requirements - Validating Requirements. BUILDING THE ANALYSIS MODEL: Requirements Analysis - Analysis Modeling Approaches – Data Modeling Concepts - Object-oriented Analysis- Scenario-Based Modeling -   Flow-Oriented Modeling - Class-Based Modeling - Creating a Behavioral Model. (Chapters 5, 6, 7 AND 8)

UNIT - III

DESIGN ENGINEERING: Design within the Context of Software Engineering - design Process and Design Quality - Design Concepts - The Design Model - Pattern-Based Software Design.
CREATING AN ARCHITECTURAL DESIGN: Software Architecture - Data Design - Architectural Styles and Patterns - Architectural Design   - Assessing Alternative Architectural Designs - Mapping Data Flow into Software Architecture. MODELING COMPONENT-LEVEL DESIGN: What is a Component?   -   Designing   Class-Based Component-Level Design - Object Constraint Language - designing Conventional Components. (Chapters 9, 10 and 11)

UNIT - IV

PERFORMING USER INTERFACE DESIGN: The Golden Rules - User Interface Analysis and Design - Interface Analysis - Interface Design Steps - Design Evaluation. RISK MANAGEMENT: Reactive vs. Proactive Risk Strategies - Software Risks - Risk Identification - Risk Projection - Risk Refinement - Risk Mitigation, Monitoring, and Management - The RMMM Plan. QUALITY MANAGEMENT: Quality Concepts - Software Quality Assurance - Software Reviews - Formal Technical Reviews - Formal Approaches   to   SQA   -   Statistical   Software   Quality   Assurance   - Software Reliability - The ISO 9000 Quality Standards - The SQA Plan. (Chapters 12, 25 and 26)

TEXT BOOK:
1.   SOFTWARE ENGINEERING BY R.S. PRESSMAN (Mc. Graw Hill Sixth Edition)
REFERENCE BOOKS:
1.   SOFTWARE ENGINEERING BY GHEZZI (PHI)
2.   SOFTWARE ENGINEERING FUNDAMENTALS BY BEHFOROOZ AND HUDSON OXFORD UNIVERSITY PRESS
3.   SOFTWARE ENGINEERING BY FAIRLEY (Mc.Graw Hill)

MCA214	**PRINCIPLES AND PRACTICES OF MANAGEMENT**	**PPM**
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

UNIT – I

MANAGEMENT: Meaning - Nature - Significance of Management Principles of Management - Approaches to Management, Development of Management Thought, Management Process and Skills, Managers and Environment, Social Responsibilities of Management. PLANNING: Concept, Characteristics - Importance and Limitations Steps in Planning Process - Strategic Planning - Decision Making.

UNIT – II

ORGANISING: Concept - Importance - Steps in Organizing Process Base and Problems of Departmentation - Delegation of Authority - Centralization and Decentralization - Line and Staff Relations - Span of Management.

UNIT – III

DIRECTING: Nature and Importance - Communication - Concept Elements - Process - Patterns of Communication - Barriers to Communication. MOTIVATION: Nature and Significance - Types of Motivation, Determinants of Motivation - A Brief Discussion on Theories of Motivation (MASLOW's Theory, McCLLELAND FNEED THEORY, THEORY X AND THEORY Y).LEADERSHIP: Concept - Importance - Leadership Styles - Autocratic, Democratic and Free Rein.

UNIT – IV

STAFFING: Concept - Human Resource Planning - A Brief Description of Recruitment - Selection - Training and Appraisal Methods Controlling: Meaning - Importance - Steps in Control Process - Problems of Controlling - A Brief Description of Control Techniques. COORDINATION: Need for Coordination - Approaches to Effective Coordination - Techniques of Coordination.

TEXT BOOKS

PRINCIPLES AND PRACTICE OF MANAGEMENT BY L.M. PRASAD.

REFERENCE BOOKS

1. MANAGEMENT, JAMES A.F. STONER AND CHARLES WANKEL
2. MANAGEMENT, KOONTZ HAROLD AND O'DONNEL CYRIL
3. ORGANISATION AND MANAGEMENT, LOUIS ALLEN
4. MANAGEMENT - TASKS AND RESPONSIBILITIES, PETER F DRUCKER

MCA215	.NET PROGRAMMING	.NET
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T - I

INTRODUCTION TO .NET FRAMEWORK: .NET Overview - Behind Microsoft .NET- The .NET Platform - .NET Framework Design Goals -.NET Framework. - The Common Language Runtime - CLR Environment and Executables – Metadata - JIT Compilation - Automatic Memory Management - Assemblies and Manifests - Intermediate Language (IL) - The CTS and CLS - CLR Execution.
FUNDAMENTALS OF VISUAL BASIC- Introduction to Visual Basic .NET, Windows forms, Control Classes, Different Types of Boxes, Labels, Buttons, Panels and Exception handling. Windows Forms applications and GDI+ - Windows Forms custom control creation. Different types of Bars, Menus, and Views. (Chapters 1 to 7)

U N I T - II

CONSOLE PROGRAMMING:
VISUAL BASIC.NET: Visual Basic .NET- Modules- variables- error handling- Arrays, lists - collections – Files- directories- streams - Object serialization - Regular expressions – Threading
OBJECT ORIENTED PROGRAMMING: Classes and objects constructors and destructors, inheritance, modifiers, Interfaces, Polymorphism, late Binding, Graphics handling and File handling. (Chapters 8 to 13)

U N I T - III

ASP.NET: Introduction - Working in ASP.NET -Controls - Working with web forms, Web forms and HTML, The Web control class, Web Forms and Boxes, Web Forms and Buttons, Validation Controls, Ad Rotators, Web Forms and HTML controls. Session & Cookies – Caching - Authentication & Authorization - Web User Controls - Working with Web Config file - Implementing Security - Crystal Reports - Creating Setup and Deployment. (Chapters 14 to 19)

U N I T - IV

APPLICATION DEVELOPMENT USING ADO .NET: Features of ADO.NET. Architecture of ADO.NET – ADO.NET providers –Accessing Data bases Using ADO.NET- Connection opening and closing– Command object – Data Adapter – Dataset – Data Tables - Controlling table views with Data Views and Data Relation Objects- Data-binding in Windows Forms and Web Forms. Data base access in Web Applications. Creating user Controls, Web user Controls, and Multithreading creating Windows services, Web Services and Deploying applications. (Chapters 20 to 25)

TEXT BOOK

1. VB.NET PROGRAMMING (BLACK BOOK) BY STEVEN HOLZNER (Dreamtech- 2003)
 2. .NET Framework Essentials, Third Edition, Thuan L.Thai, Hoang Lam Publisher: O'Reilly. 2003

REFERENCE BOOKS

   1. VB.NET PROGRAMMING BY T. GADDIS (Dreamtech)
   2. Microsoft Visual Basic. Net step by step By Halverson (PHI)
   3. OOP with Microsoft Visual Basic.Net By Reynolds Hacrtte (PHI)

MCA216	**DATABASE MANAGEMENT SYSTEM Laboratory**	DBMSL
WORK LOAD: 4 PPW	**ASSIGNMENTS ASSESSMENT**	**EXTERNAL MARKS: 50**

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

MCA217	**SOFTWARE ENGINERING Laboratory**	STL
WORK LOAD: 4 PPW	**ASSIGNMENTS ASSESSMENT**	**EXTERNAL MARKS: 50**

SOFTWARE TESTING – Introduction, purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs. Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle. Basic Structural Modeling: Classes, Relationships, Class & Object Diagrams. Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams, Component, Deployment, Component diagrams and Deployment diagrams; Caste Study on Unified Library Application(ULA).

To learn and use the testing tools to carry out the functional testing, load/stress testing and use the following (or similar) automated testing tools to automate testing:

      a) Win Runner/QTP for functional testing.
      b) Load Runner for Load/Stress testing.
      c) Test Director for test management.

List of Sample Programs /Experiments

1. The student should take up the case study of Unified Library Application (ULA) which is mentioned in the theory, and Model it in different views i.e Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.

2. Student has to take up another case study of his/her own interest and do the same what ever mentioned in first problem. Some of the ideas regarding case studies are given in reference books which were mentioned and it would be referred for some new idea.

REFERENCE BOOKS:
1. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech
2. Software Testing Concepts and Tools, P.Nageswara Rao, Dreamtech Press.
3. Grady Booch, James Rumbaugh, Ivan Jacobson : The Unified Modeling Language User Guide, Pearson Education 2nd Edition

MCA218	.NET PROGRAMMING Laboratory	.NETL
WORK LOAD: 4 PPW	**ASSIGNMENTS ASSESSMENT**	**EXTERNAL MARKS: 50**

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

MCA II YEAR II SEMESTER:

| Paper No | Paper Title / Subject | Workload Per week (Theory : Lab) | M A R K S | | | Credits |
			Internal	External	Total	
MCA221	Data Mining	T (4)	20	80	100	4
MCA222	Unix Network Programming	T (4)	20	80	100	4
MCA223	Web Technologies	T (4)	20	80	100	4
MCA224	Mobile Communications	T (4)	20	80	100	4
MCA225	Accountancy and Financial Management	T (4)	20	80	100	4
MCA226	Unix Network Programming Laboratory	L (4)	--	50	50	2
MCA227	Web Technologies Laboratory	L (4)	--	50	50	2
MCA228	Data Mining Laboratory	L (4)	--	50	50	2
Grand total (marks and credits)					**650**	**26**

MCA221	DATA MINING	DM
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

UNIT – I

INTRODUCTION: What is Data Mining? , Data Mining on what kind of data?, Data Mining Functionalities, Are all of the Patterns Interesting?, classification of data mining systems, Data Mining Task primitives, Integration of a Data Mining System with a Database or data warehouse system , Major issues in Data Mining. DATA PREPROCESSING: Why preprocess the data, Descriptive Data summarization, Data Cleaning, Data Integration and transformation, Data reduction, Data Discrimination and concept Hierarchy Generation. (Chapters 1 & 2)

UNIT – II

DATA WAREHOUSE AND OLAP TECHNOLOGY: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture, data Warehouse Implementation, from Data Warehouse to data mining? Data Cube Computation and data Generalization. Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-oriented Induction-An alternative method for Data Generalization and concept Description.(Chapters 3 & 4)

UNIT – III

MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS: Basic concepts and a road Map, Efficient and scalable Frequent Item set Mining methods, Mining various kinds of Association Rules, from Association Mining to Correlation analysis, constraint-Based Association mining. CLASSIFICATION AND PREDICTION : What is classification and Prediction, issues regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, support Vector Machines, Associative Classification, Lazy Learners, Other Classification methods, Prediction, accuracy and error measures, evaluating the accuracy of a classifier or predictor, Ensemble methods, Model selection.(Chapters 5 & 6)

UNIT – IV

CLUSTER ANALYSIS: What is Cluster analysis, types of data in cluster analysis, a categorization of major clustering methods, Partitioning methods, Hierarchical methods, Density Based methods, Grid Based methods, Model-Based Clustering methods, clustering high-dimensional data, constraint-based cluster analysis, Outlier analysis.   (Chapters 7)

TEXT BOOKS

1. DATA MINING CONCEPTS & TECHINIQUES BY JIAEEI HAN, MICHELINE & KAMBER (2nd EDITION) (Elsevier Publishing Company)

REFERENCE BOOKS
1.   Data Mining Techniques – ARUN K PUJARI, University Press.
2.   The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION
3.   Data Warehousing by S Mohanthy (TMH)
4.   Data Warehousing by Amitesh Sinha (Thomson)
5.   Data Mining by P Adriaans & D Zantinge (Pearson)
6.   Data Mining by S M Sivanandam & S Sumathi

MCA222	**UNIX NETWORK PROGRAMMING**	**UNP**
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

UNIT I

INTRODUCTION TO UNIX FILE SYSTEM, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, cp, mv, ln, rm, unlink, kdir, rmdir, ps, who, w, ftp, telnet, rlogin, text processing utilities. Unix file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, creat, read, write, close, lseek, stat, fstat. Process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, system call interface for process management-fork, vfork, exit, wait, waitpid, exec, system, Signals- Signal functions, unreliable signals, interrupted system calls, kill. INTERPROCESS COMMUNICATION: File and Record Locking, Simple Client-server Pipes, FIFO's, Streams and Messages, Name Spaces, System V IPC, Message Queues, Semaphores, Shared Memory.(Chapters 3.1 to 3.12 of Text Book:1 & 2)

UNIT II

A Network Primer Communication Protocols: Introduction, TCP/IP, XNS, SNA, NetBIOS, OSI Protocol, UUCP, Protocols Comparisons. (Chapters 4, 5, 5.1 to 5.8 of Text Book:1)

UNIT III

Berkeley Sockets: Introduction, Overview, Unix Domain Protocols, Socket Addresses, Elementary Socket System Calls, Simple Examples, Advanced Socket System Calls, Reserved Ports, Stream Pipes, Passing File Descriptors, Socket Options, Asynchronous I/O, Input/Output Multiplexing, Out-of-Band and Data, Sockets and Signals, Internet Super server, Socket Implementation. (Chapters 6, 6.1 to 6.17 of Text Book:1)

UNIT IV

Transport, Overview, Transport Endpoint Addresses, Elementary TLI Functions, Simple Example, Advanced TLI Functions, Streams, TLI Implementation, Stream Pipes, Passing File Descriptors, Input/Output Multiplexing, Asynchronous I/O, Out-of-Band Data. (Chapters 7, 7.1 to 7.13 of Text Book:1)

TEXT BOOK:

1. UNIX NETWORK PROGRAMMING BY W. RICHARD STEVENS
2. UNIX CONCEPTS AND APPLICATIONS, 3RD EDITION, SUMITABHA DAS, TMH.

REFERENCE BOOKS

1. UNIX SYSTEMS PROGRAMMING – K.A. ROBBINS, S. ROBBINS (PEARSON)
2. UNIX THE C ODYSSEY – M. GANDHI, SHETTI, SHAH (BPB PUBLICATIONS)
3. ADVANCED UNIX PROGRAMMING - MJ ROCHKIND (PEARSON)

MCA223	WEB TECHNOLOGIES	ADJ
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T – I

FILES AND STREAMS: Introduction, Data Hierarchy, Files and Streams, Creating a Sequential-Access File, Random-Access Files, Reading Data Sequentially from a Random-Access File.
NETWORKING: Introduction, Manipulating URLs, Reading a File on a Web Server, Establishing a Simple Server, Establishing a Simple Client, Client/Server Interaction with Stream Socket Connections, Connectionless Client/Server Interaction with Datagram's, Client/Server Tic-Tac-Toe Using a Multithreaded Server, Security and the Network.)

U N I T –II

JDBC: JDBC Overview, Architecture, Types of JDBC Drivers, DriverManager; Database Connection Statements , ResultSet, transaction,DataBaseMetadata,ResultSetMetadata and Aggregate functions, PreparedStatement,CallableStatement, Connection to various back ends.; New Features in the JDBC 2.0 /3.0 /4.0 API
RMI: Introduction, Defining the Remote Interface Implementing the Remote Interface, Define the Client, Compile and Execute the Server and the Client. Case Study on creating a distributed system with database programming.RMI Security.

U N I T – III

SERVLETS: Servlet Basics, Setting up Servlet API. Creating a Java Web Application, The Servlet URL and Invoking Web Page, Servlet Structure, Testing a Servlet, Passing Data. Overview of Serves, Interacting with Clients, Servlet Runner Utility, Running Servlets. WEB SERVERS: Server installation, configuration and deployment procedure. MORE ON SERVLETS: The javax.servelet HTTP package, Handling Http Request & Responses, Accessing a Database Data Manipulation Operations via a Servlet; Using Cookies-Session Tracking, Security Issues.

U N I T – IV

INTRODUCTION TO JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC architecture's APPLICATION DEVELOPMENT: Generating Dynamic Content, JSP Tags, Using Scripting Elements Implicit JSP Objects, JSP-Rationale behind JSP's,compilation and execution, collaborating with Servlets,JSP's in Action, Error Pages, Using JSP's to access databases and remote databases.

TEXT-BOOK

1. AN INTRODUCTION TO NETWORK PROGRAMMING WITH JAVA, Jan Graba (Springer)
2. JAVA HOW TO PROGRAM Third Edition - Deitel & Deitel
3. THE JAVA TUTORIAL CONTINUED Compione, Walrath, Huml, Tutorial Team - Addison Wesley

REFERENCE BOOKS

1. Java Server Pages –Hans Bergsten, SPD O'Reilly.
2. J2EE 1.4 Bible (Dreamtech-2003).
3. Advance Java Technology – Prof. Savaliya- Dreamtech Press.
4. Java Server Programming, J2EE 1.6- KONGENT- Dreamtech press.

MCA224	MOBILE COMMUNICATIONS	MC

WORK LOAD: 4 PPW	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT I

Introduction to Mobile Communications and Computing: Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture's : Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services. (Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT II

Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT III

Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues. Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT IV

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs. Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and Treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

TEXT BOOK:

1. Jochen Schiller,"Mobile Communications", Addison-Wesley. (Chapters: 4, 7, 9, 10, 11), second edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002 (Chapters 11, 15, 17, 26 and 27)

REFERENCE BOOKS

1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October 2004.
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition, 2003.
4. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley DreamTech, 2003.

MCA225	ACCOUNTANCY AND FINANCIAL MANAGEMENT	AFM
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

UNIT – I

Accounting Information System – Users of accounting information, Accounting concepts and conventions, Double entry system – Journal, Journalizing. Ledger Posting – Balancing, Subsidiary books – purchase, Sales, P/R, S/R, Cash Book, cash book Triple column – Problems, Trial Balance – Preparation of T/B problems.

UNIT – II

Financial Statements – Utility to users, Trading A/C, Profit & Loss A/C – Classification of Expenses. Classification of Assets and Liabilities, Balance Sheet – Problems – Adjustments: closing stock, outstanding expenses and incomes, prepaid expenses and incomes received in advance, Depreciation, Bad debts, provision for Doubtful debts; interest on capital and Drawings, Problems pertaining to sole Traders, Financial Statements of Non- Profit organization, Receipts & payments A/C, Income and Expenditure A/C and Balance Sheet – simple problems without adjustments.

UNIT - III

Financial Management – Meaning – Need - Profit maximization VS wealth maximization. Financial Decisions making - Financing Decisions – Sources of Finance: Equity, Debt – Cost of various sources of financing – concept of capital structure (simple description).Financial Analysis – Meaning – indicators of financial status – profitability liquidity, solvency, turnover, Leverage, Types of Financial Analysis – Horizontal Analysis – comparative statements, Vertical Analysis – Common Size statement.

UNIT – IV

Cost Accounting – Meaning – Significance of cost information Costs – Meaning. Classification: Functional Classification Behavior of costs – Fixed, variable – Features Simple description of costing methods, Preparation Cost sheet. Marginal Costing – Meaning – Marginal cost Statement, Break even Analysis - Simple Problems of Marginal costing.

TEXT BOOK

1. Gupta, R.L. and Radha Swamy, M., Accountancy, Sultan Chand & Sons, New Delhi

REFEREBCE BOOKS:

1. Mukarjee A and Hanif M, Modern Accountancy, Tata Mc Graw Hill, New Delhi
2. Tulsin P.C, Financial Accounting, TMH, New Delhi
3. Maheswar SN and Maheswari S.K., Finanical Accounting, Vikas Publishing House, Mumbai
4. Pandey I.M., Financial Management, Vikas Publishing House, Mumbai.
5. Khan M. Y and Jain P.K., Financial Management, TMH, New Delhi
6. Maheshwari S.N, Cost and Management Accounting, Vikas Publishing House, Mumbai
7. Jain P.K. and Naraang K.L., Cost Accounting, kalyani Publishers, Mumbai
8. Catherine Gowthrope, Business Accounting and Finance: For Non specialists (2nd Ed.)
International Thomson Business press, Singapore.

MCA226	UNIX NETWORK PROGRAMMING Laboratory	UNPL
WORK LOAD: 4 PPW	**ASSIGNMENTS ASSESSMENT**	**EXTERNAL MARKS: 50**

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

MCA227	WEB TECHNOLOGIES Laboratory	WTL
WORK LOAD: 4 PPW	**ASSIGNMENTS ASSESSMENT**	**EXTERNAL MARKS: 50**

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

MCA228	DATA MINING Laboratory	DML
WORK LOAD: 4 PPW	**ASSIGNMENTS ASSESSMENT**	**EXTERNAL MARKS: 50**

Weka is a collection of machine learning algorithms for data mining tasks. The algorithms can either be applied directly to a datasets#. Weka contains tools for data pre-processing, classification, regression, clustering, association rules, and visualization.

Launching WEKA, COMMAND-LINE(simple CLI), EXPLORER-User Interface, Preprocessing, Classification, Clustering, Associating, Selecting Attributes, Visualizing; EXPERIMENTER-Simple, Advanced; KNOWLEDGEFLOW-Introduction, Features, Components; ArffViewer; Converters;etc.,

RESOURCES:

Manuals and Software:
- http://www.cs.waikato.ac.nz/ml/weka/index.html
Collections of Datasets:
- # http://www.cs.waikato.ac.nz/ml/weka/datasets.html

DEPARTMENT OF COMPUTER SCIENCE
MCA COURSE STRUCTURE UNDER CBCS
WITH EFFECT FROM 2016-17

MCA III YEAR I SEMESTER:

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	M A R K S			Credits
			Internal	External	Total	
MCA311	Artificial Intelligence	T (4)	20	80	100	4
MCA312	Cryptography and Network Security	T (4)	20	80	100	4
MCA313	Mobile Application Development	T (4)	20	80	100	4
MCA314	Elective - I	T (4)	20	80	100	4
MCA315	Elective – I I	T (4)	20	80	100	4
MCA316	Mobile Application Development Laboratory	L (4)	--	50	50	2
MCA317	Cryptography and Network Security Laboratory	L (4)	--	50	50	2
MCA318	Mini Project Laboratory	L (4)	--	50	50	2
Grand total (marks and credits)					**650**	**26**

No.	Elective - I	No.	Elective – I I
A	Cloud Computing	A	Soft Computing
B	Human Computer Interaction	B	E-Commerce
C	Software Project Management	C	Information Retrieval System

MCA311	ARTIFICIAL INTELLIGENCE	AI
WORK LOAD: 4 PPW	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT – I

ARTIFICIAL INTELLIGENCE: ITS ROOTS AND SCOPE, AI: HISTORY AND APPLICATIONS: From Eden to ENIAC: Attitudes toward Intelligence, Knowledge, and Human Artifice, Overview of AI Application Areas. ARTIFICIAL INTELLIGENCE AS REPRESENTATION AND SEARCH: Introduction, The Prepositional Calculus, The Predicate Calculus, Using co Rules to Produce Predicate Calculus Expressions, Application: A Logic-Based Financial Advisor.   (Chapters 1 & 2)

UNIT – II

STRUCTURES AND STRATEGIES FOR STATE SPACE SEARCH: Introduction, Graph Theory, Strategies for State Space Search, Using the State Space to Represent Reasoning with the Predicate Calculus. HEURISTIC SEARCH: Introduction, An Algorithm for Heuristic Search, Admissibility, Monotonicity, and Informed ness, Using Heuristics in Games, Complexity Issues. CONTROL AND IMPLEMENTATION OF STATE SPACE SEARCH: Introduction, Recursion-Based Search, Pattern-Directed Search, production Systems, The Blackboard Architecture for Problem Solving.
       (Chapters 3, 4 and 5)

UNIT – III

REPRESENTATION AND INTELLIGENCE: THE AI CHALLENGE: KNOWLEDGE REPRESENTATION: Issues in Knowledge Representation, A Brief History of AI Representational Systems, Conceptual Graphs: A Network Language, Alternatives to Explicit Representation, Agent Based and Distributed Problem Solving. STRONG METHOD PROBLEM SOLVING: Introduction, Overview of Expert System Technology, Rule- Based Expert Systems, Model-Based, Case Based, and Hybrid Systems, Planning. (Chapters 6 and 7)

UNIT – IV

REASONING IN UNCERTAIN SITUATIONS: Introduction, Logic-Based Adductive Inference, Abduction: Alternatives to Logic, the Stochastic Approach to Uncertainty.
       (Chapter 8)

TEXT BOOK:

1. ARTIFICIAL INTELLIGENCE by George F Luger, Pearson Education.

REFERENCE BOOKS
   1. ARTIFICIAL INTELLIGENCES by Ritch & Knight.
   2. INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS By
          D.W. Patterson,(PHI-2001)
   3. ARTIFICIAL INTELLIGENCE By Patrick Henry Winston(Pearson)
   4. PRINCIPLES OF ARTIFICIAL INTELLIGENCE (Narosa)
   5. Artificial Intelligence By Shiart Russel Peter Norvig (Pearson)
   6. EXPERT SYSTEMS SYSTEMS AND PRACTICE By Giarratano & Riely (Thomson)
   7. ARTIFICIAL INTELLIGENCE APPLICATIONS PROGRAMMING By M Tim Jones

MCA312	CRYPTOGRAPHY AND NETWORK SECURITY	CNS
WORK LOAD: 4 PPW	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

U N I T – I

INTRODUCTION: Attacks, Services, and Mechanisms, Security Services. CONVENTIONAL ENCRYPTION TECHNIQUES: Cryptography, Steganography, Classical Encryption Techniques. MODERN TECHNIQUES: Simplified DES, The Data Encryption Standard, Differential and Linear Cryptanalysis, Block Cipher Modes of Operation.

U N I T – II

CONFIDENTIALITY USING CONVENTIONAL ENCRYPTION: - Traffic Confidentiality, Random Number Generation. PUBLIC-KEY CRPTOGRAPHY: - Principles of Public-Key Cryptosystems, the RSA Algorithm, Diffie - Hellman Key Exchange, Elliptic Curve Cryptography. INTRODUCTION TO NUMBER THEORY: - Prime and Relatively Prime Numbers, Fermat's and Euler's Theorem, Euclid's Algorithm, The Chinese Remainder Theorem, And Discrete Logarithms.

U N I T – III

MESSAGE AUTHENTICATION AND HASH FUNCTIONS: - Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs. DIGITAL SIGNATURES AND AUTHENTICATION PROTOCOLS: - Digital Signatures, Authentication Protocols, Digital Signature Standard.

U N I T – IV

ELECTRONIC MAIL SECURITY: S/MIME.IP SECURITY: IP Security Overview, IP Security Architecture, Encapsulating Security Payload, Key Management. FIREWALLS: Firewall Design Principles, Trusted Systems.

TEXT BOOK:

CRYPTOGRAPHY AND NETWORK SECURITY principles and Practice FOURTH Edition By William Stallings (Pearson Asia)

REFERENCE BOOKS

1. DAVIES & PRICE : SECURITY FOR COMPUTER NETWORKS - Wiley (1984)
2. MAYER & MATYAS : CRYPTOGRAPHY – Wiley B. SCHNEIER : APPLIED CRYPTOGRAPHY -
   (John Wiley)
3. CRYPTOGRAPHY IN C AND C++ :WEISCHANBACH – A PRESS
4. CRYPTOGRAPHY MYSTIFIED :HERSHEY
5. INTRODUCTION TO CRYPTOGRAPHY BY J A BUCHANAN (SPRINGER)

MCA313	**Mobile Application Development**	MAD
WORK LOAD: 4 PPW	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

Unit I
J2ME Overview
Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices
Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants

Unit II
J2ME Architecture and Development Environment
J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices

Unit III
Commands, Items, and Event Processing ,J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling .
High-Level Display: Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class
Low-Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation

Unit IV
Record Management System:Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener
JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions.
JDBC and Embedded SQL: Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data form a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Subqueries, VIEWs

TEXT BOOK
    1.J2ME: The Complete Reference, James Keogh, Tata McGrawHill.

REFERENCE BOOKS
    1. Enterprise J2ME: Developing Mobile Java Applications – Michael Juntao
        Yuan, Pearson Education, 2004
    2. Beginning Java ME Platform, Ray Rischpater, Apress, 2009
    3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li,
        Jonathan B. Knudsen, Apress, 2005
    4. Kicking Butt with MIDP and MSA:Creating Great Mobile Applications,1st
        edition,J.Knudsen,Pearson.

MCA314	ELECTIVE - I	E-I
WORK LOAD: 4 PPW	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

A. Cloud Computing

U N I T – I
INTRODUCTION: Essentials, Benefits and need for Cloud Computing - Business and IT Perspective - Cloud and Virtualization - Cloud Services Requirements - Cloud and Dynamic Infrastructure - Cloud Computing Characteristics Cloud Adoption. CLOUD MODELS: Cloud Characteristics - Measured Service - Cloud Models - Security in a Public Cloud Public versus Private Clouds - Cloud Infrastructure Self Service. CLOUD AS A SERVICE: Gamut of Cloud Solutions - Principal Technologies - Cloud Strategy Cloud Design and Implementation using SOA - Conceptual Cloud Model - Cloud Service Defined

U N I T – II
CLOUD SOLUTIONS: Cloud Ecosystem - Cloud Business Process Management - Cloud Service Management - Cloud Stack - Computing on Demand (CoD) – Cloud is sourcing. CLOUD OFFERINGS: Information Storage, Retrieval, Archive and Protection - Cloud Analytics Testing under Cloud - Information Security - Virtual Desktop Infrastructure - Storage Cloud. CLOUD MANAGEMENT: Resiliency – Provisioning - Asset Management - Cloud Governance - High Availability and Disaster Recovery - Charging Models, Usage Reporting, Billing and Metering.

U N I T – III
CLOUD VIRTUALIZATION TECHNOLOGY: Virtualization Defined - Virtualization Benefits - Server Virtualization - Virtualization for x86 Architecture - Hypervisor Management Software - Logical Partitioning (LPAR)- VIO Server - Virtual Infrastructure Requirements. CLOUD VIRTUALIZATION: Storage virtualization - Storage Area Networks - Network-Attached storage - Cloud Server Virtualization - Virtualized Data Center.

U N I T – IV
CLOUD AND SOA: SOA Journey to Infrastructure - SOA and Cloud - SOA Defined - SOA and IaaS - SOA-based Cloud Infrastructure Steps - SOA Business and IT Services. CLOUD INFRASTRUCTURE BENCHMARKING: OLTP Benchmark - Business Intelligence Benchmark e-Business Benchmark - ISV Benchmarks - Cloud Performance Data Collection and Performance Monitoring Commands - Benchmark Tools.

TEXT BOOK:
        1. Cloud Computing – Insight into New Era Infrastructure, Dr. Kumar
Saurabh, Wiley India.

REFERENCE BOOKS:

        1. Cloud Computing, Roger Jennings, Wiley India
        2. Cloud Computing Explained, John Rhoton, Recursive Press
        3. Cloud Computing Bible, Barry Sosinsky, Wiley
        4. Cloud Computing: Principles and Paradigms, Rajkumar Buyya, James
        Broberg, Wiley
        5. Cloud Computing for Dummies, Judith Hurwiz, Wiley Publishing.
        6. The Cloud at your service, Rosenberg and Matheos, Manning Publications

B. HUMAN COMPUTER INTERACTION

UNIT - I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design,
The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.
Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - III

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.
Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT - IV

Software tools – Specification methods, interface – Building Tools.
Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS:
1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia

REFERENCE BOOKS:
1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen , Pearson Education.
4. Human –Computer Interaction,D.R.Olsen,Cengage Learning.
5. Human –Computer Interaction,Smith - Atakan,Cengage Learning.

C. SOFTWARE PROJECT MANAGEMENT

UNIT I

INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT
Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

PROJECT EVALUATION
Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT II

ACTIVITY PLANNING
Objectives – Project Schedule – Sequencing And Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity On Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

UNIT III MONITORING AND CONTROL

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT IV MANAGING PEOPLE AND ORGANIZING TEAMS

Introduction – Understanding Behavior – Organizational Behaviour: A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman–Hackman Job Characteristics Model – Working In Groups
– Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health And Safety – Case Studies.

REFERENCES:
1. Bob Hughes and MikeCotterell "Software Project Management", Third Edition, TATA McGraw Hill Edition 2004.
2. Ramesh, Gopalaswamy: "Managing Global Projects ", Tata McGraw Hill, 2001.
3. Royce." Software Project Theory", Pearson Education, 1999.
4. P.Jalote "Software Project Management In Practice", Pearson Education, 2000.

CA315	ELECTIVE - II	E-II
WORK LOAD: 4 PPW	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

A. Soft Computing

UNIT-I

AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic and Rules.

UNIT-II

Artificial Neural Networks: Introduction, Basic models of ANN, impotant terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Backpropogation Network. Asscociative Memory Networks. Traing Algorithms for pattern association, BAM and Hopfield Networks.

UNIT-III

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets,
Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propogation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

UNIT-IV

Introduction to Classical Sets (crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.
Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.
Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning
Fuzzy Decision making

Text Books:
1 Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007
2 Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva,. Pearson Edition, 2004.

References:
1. Artificial Intelligence and SoftComputing- Behavioural and Cognitive Modelling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.

B. E- Commerce

UNIT - I

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.
Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT - II

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.
Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT - III

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.
Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.

UNIT- IV

Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.
Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processings, Desktop video conferencing.

TEXT BOOK:

1. Frontiers of electronic commerce – Kolkata, Whinstone, Pearson.

REFERENCES:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Cengage Learning..
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.
6.ElectronicCommerce,B.Bhaskar,3rdedition,TMH.

C. INFORMATION RETRIEVAL SYSTEM

UNIT I

INTRODUCTION: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, INFORMATION RETRIEVAL SYSTEM CAPABILITIES - Search, Browse, Miscellaneous. CATALOGING AND INDEXING: Objectives, Indexing Process, Automatic Indexing, Information Extraction, Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

UNIT II

AUTOMATIC INDEXING: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages. DOCUMENT AND TERM CLUSTERING: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters. USER SEARCH TECHNIQUES: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext
- INFORMATION VISUALIZATION: Introduction, Cognition and perception, Information visualization technologies.

UNIT III

TEXT SEARCH ALGORITHMS: Introduction, Software text search algorithms, Hardware text search systems. INFORMATION SYSTEM EVALUATION: Introduction, Measures used in system evaluation, Measurement example – TREC results. PARALLEL AND DISTRIBUTE IR - Parallel Computing, Performance Measures, Parallel IR - MIMD and SIMD Architectures, Distributed IR – Collection Partitioning, Source Selection, Query Processing, Web Issues, Trends and Research Issues.

UNIT IV

MULTIMEDIA INFORMATION RETRIEVAL – Models and Languages – Data Modeling, Query Languages, Indexing and Searching. BRARIES AND BIBLIOGRAPHICAL SYSTEMS – Online IR Systems, OPACs, Digital Libraries.

TEXT BOOK:
1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury Kluwer Academic Press, 2000.

REFERENCES:

1. Modern Information Retrival By Ricardo Baeza-Yates, Pearson Education, 2007.
2. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder, 2nd Edition, Springer International Edition, 2004.
3. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
4. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.

5. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar,Raghavan, Cambridge University Press, 2008.

1. Write a program that contains a string (char pointer) with a value „Hello world".
   The program should XOR each character in this string with „0" and displays the result.
2. Write a program that contains a string (char pointer) with a value „Hello world".
   The program should AND, OR and XOR each character in this string with 127 and display the result.
3. Write a program to perform encryption and decryption using Ceaser Cipher algorithm.
4. Write a program to perform encryption and decryption using Substitution cipher algorithm.
5. Write a program to perform encryption and decryption using Hill Cipher algorithm.
6. Write a program to implement the DES algorithm logic.
7. Write a program to implement RSA Algorithm.
8. Write a Program to Implement DES-2.
9. Write a program to implement Diffie-Hellman Key Exchange mechanism.
10. Write a program to encrypt user"s passwords before they are stored in a database table, and to retrieve them whenever they are to be brought back for verification.
11. Write a program on Key generation (public and private key pair).
12. Write a program to perform a digital signature on a given text.
13. Write a program to implement Random Number Generation Algorithm.
14. Write a program to implement MAC generation algorithm.
15. Write a program to implement MAC with hash.
16. Write a program to implement MAC with single key.
17. Write a program to implement MAC with double key.

Note: The above programs can be implemented using C/C++/Java.
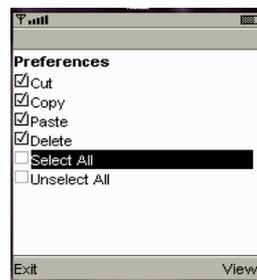
1. Create a program which creates to following kind of menu.

- cut
- copy
- past
- delete
- select all
- unselect all
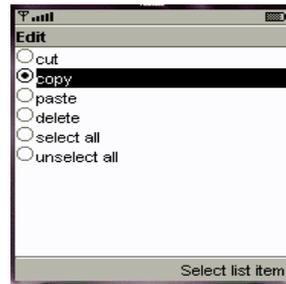
2. Create a menu which has the following options:
- cut - can be on/off
- copy - can be
- on/off paste - can
- be on/off delete -
- can be on/off
- select all - put all 4 options
- on unselect all - put all 4
options off

3. Create an MIDP application which examine, that a phone number, which a user has entered is in the given format.

- Area code should be one of the following: 040, 041, 050, 0400, 044
- There should 6-8 numbers in telephone number (+ area code)
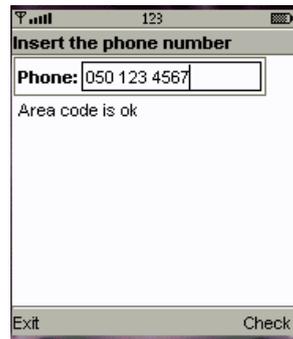
4. Create a slide show which has three slides, which includes only text. Program should change to the new slide after 5 seconds. After the third slide program returns to the first slide.
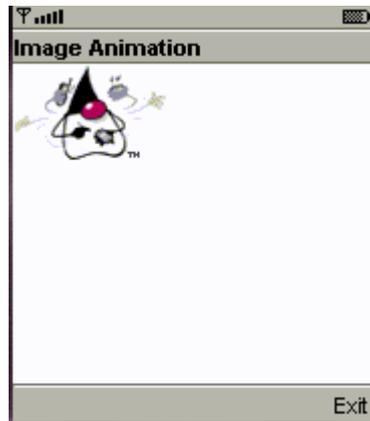

5. Create a MIDP application, which show to the user 5-10 quiz questions. All questions have 4 possible options and one right option exactly. Application counts and shows to the user how many right answers were right and shows them to user.
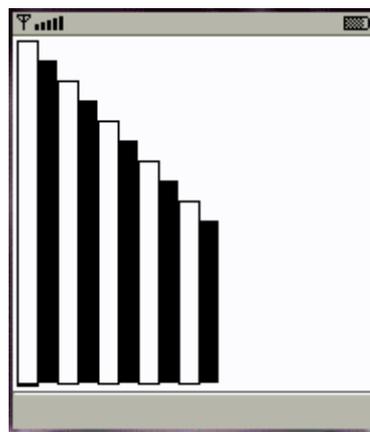

6. Create a MIDP application, where the user can enter player name and points. The program saves the information to the record using RMS at MIDP device. Program should also print out the top 10 player list to the end user. You can use this class in your game if you made own class for saving and reading record sets.

7. Create a slide show which has three slides, which includes pictures at PNG format. Program should change to the new slide other 5 seconds.

8. Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array.

9. Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data (integer) values to the input text field.
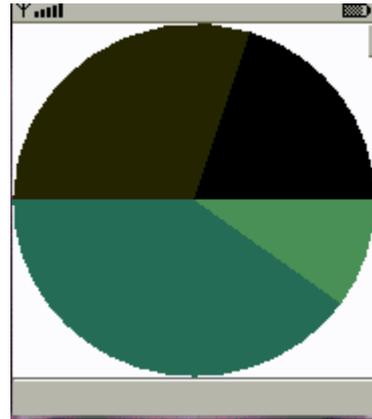
10. Create, compile and run a basic UDP-based client-server application.

5 MCA L- 3	MINI PROJECT LAB	MPL
WORK LOAD: 4 PPW	ASSIGNMENTS ASSESSMENT	EXTERNAL MARKS: 50

Students should carry out the mini project based on the subjects studied in the course.

MCA III YEAR II SEMESTER:

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA321	MAJOR PROJECT WORK	-	-	150	150	6

MCA321	MAJOR PROJECT WORK		MPW
WORK LOAD: 0 PPW	REVIEW ASSESSMENT		EXTERNAL MARKS: 150

The Project work constitutes a major component in most professional programmes. It needs to be carried out with due care, and should be executed with seriousness by the students. The project work is not only a partial fulfillment of the MCA requirements, but also provide a mechanism to demonstrate ASK (Attitude, Skills, and Knowledge) with specialization. The project work should compulsorily include the software development.

The majority of the students are expected to work on a real-life project preferably in some industry/ R&D Laboratories / Educational Institution / Software Company. Students are encouraged to work in their interested area. However, it is NOT MANDATORY for a student to work on a real-life project. The student can formulate a project problem with the help of his / her Guide and submit the project proposal of the same. APPROVAL OF THE PROJECT PROPOSAL IS MANDATORY. If approved, the student can commence working on it, and complete it. Use the latest versions of the software packages for the development of the project. Project problem domain selected and the specifications should be very much genuine.

Every student is mandatory to present two seminars in the sixth semester on the progress of the project.