ACADEMIC REGULATIONS
Applicable for students admitted into
MASTER OF COMPUTER APPLICATIONS Programme from 2014-15

The Jawaharlal Nehru Technological University Anantapur, Anantapuram shall confer Master of Computer Applications (M.C.A) Degree to candidates who are admitted to the M.C.A program and fulfill all the requirements for the award of the degree.

1. ELIGIBILITY FOR ADMISSION:

Admission to the MCA Degree programme shall be made subject to the eligibility, qualification prescribed by the competent authority from time to time.

Admissions shall be made on the basis of rank obtained by the qualifying candidates at the entrance test, subject to reservations or policies framed by the Government of Andhra Pradesh from time to time.

2. ADMISSION PROCEDURE:

Admissions as per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year as follows:

(a) A - Category Seats are to be filled by the Convener, through ICET

(b) B - Category Seats will be filled by the Management as per the norms stipulated by Govt. of Andhra Pradesh.

3. COURSE WORK:

3.1 A candidate after securing admission must pursue the MCA course of study for Six semesters duration

3.2 Each semester shall be of 90 instruction days.

3.3 A candidate admitted to a programme should complete it within a period equal to twice the prescribed duration of the programme from the date of admission.

4. ATTENDENCE:

4.1 A candidate shall be deemed to have eligibility to write end semester examinations if he has put in at least 75% of attendance aggregate in all subjects/courses in the semester.

4.2 Condonation of shortage of attendance up to 10% i.e., between 65% and above and less than 75% may be granted by the Institute Academic committee.

4.3 Shortage of attendance below 65% in aggregate shall in no case be condoned.

4.4 Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the candidate with supporting evidence.

4.5 A stipulated fee shall be payable towards Condonation of shortage of attendance to the institute as per following slab system

1st **Slab:** Less than 75% attendance but equal to or greater than 70% a normal Condonation fee can be collected from the student.

2nd **Slab**: Less than 70% but equal to or greater than 65%, double the Condonation fee can be collected from the student.

4.6 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled for that semester.

4.7 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current semester, as applicable.

4.8 A student detained due to shortage of attendance, will have to repeat that semester when offered next.

5. CREDIT SYSTEM NORMS:

Credit system norms given in Table -1

Table -1

Subject	Period(s)/Week	Credit(s)
Theory	01	01
Practical	03	02
Seminar	..	02
Project Work	..	12

6. EVALUATION:

6.1 Distribution of marks

S. No	Examination	Marks	Examination and Evaluation		Scheme of Evaluation
1.	Theory	60	Semester-end examination (External evaluation)		The question paper shall be of descriptive type with 5 questions with internal choice are to be answered in 3 hours duration of the examination.
		40	Mid - Examination of 120 Min. duration (Internal evaluation). 4 descriptive type questions with internal choice are to be answered and evaluated for 40 marks.		Two mid-exams 40 marks each are to be conducted. Better one to be considered. **Mid-I:** After first spell of instructions (I&II Units). **Mid-II:** After second spell of instructions (III, IV & V Units).
2	Laboratory	60	Semester-end Lab Examination (External evaluation)		**For laboratory courses: 3** hours duration. One External and One Internal examiners.
		40	20	Day to Day evaluation (Internal evaluation)	Performance in laboratory experiments.
			20	Internal evaluation	Practical Tests (one best out of two tests includes viva-voce)
3	Seminar in each of the semesters. 2 hours /week	100	Internal Evaluation 20 Marks for Report 20 Marks for subject content 40 Marks for presentation 20 Marks for Question and Answers		Continuous evaluation during a semester by the Departmental Committee (DC)

S. No	Examination	Marks	Examination and Evaluation		Scheme of Evaluation
4	Project work	Very Good (>90%) Good (80%) Not Satisfactory (<60%)	12 credits	External evaluation	End Project Viva-Voce Examination by Committee as detailed under section 8.7
			4 credits	Internal evaluation	Continuous evaluation by the DC.

6.2 A candidate shall be deemed to have secured the minimum academic requirement in a subject/practical if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.

6.3 A candidate has to secure a minimum of 50% to be declared successful.

6.4 In case the candidate does not secure the minimum academic requirement in any of the subjects/practical, he has to reappear for the Examination either supplementary or regular in that subject/practical along with the next batch students. A separate supplementary examinations will be conducted for the I semester students at the end of II semester.

6.5 **Revaluation / Recounting:** Students shall be permitted to request for recounting/ revaluation of the end theory examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records are updated with changes if any and the student will be issued a revised memorandum of marks. If there are no changes, the student shall be intimated the same through a letter or a notice.

7. RE-REGISTRATION FOR IMPROVEMENT OF INTERNAL EVALUATION MARKS FOR THEORY SUBJECTS

7.1 The candidate should have completed the course work for all five semesters pending project work submission.

7.2 Out of the subjects the candidate has failed in the examination due to internal evaluation marks secured being less than 50%, the candidate shall be given one chance for each theory subject and for a maximum of three theory subjects for improvement of internal evaluation marks.

7.3 The candidate has to re-register for the chosen subjects and fulfill the academic requirements. Re-registration shall not be permitted after the commencement of class work for that semester.

7.4 For each subject, the candidate has to pay a fee equivalent to one third of the semester tuition fee.

7.5 In the event of availing the improvement of internal evaluation marks, the internal evaluation marks as well as end examination marks secured in the previous attempt(s) for the re-registered subjects stand cancelled.

8. EVALUATION OF PROJECT WORK

8.1 Registration of Project work : A candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses of I to V Semester)

8.2 A Departmental Committee (D.C) consisting of HOD, Supervisor and one internal senior faculty shall monitor the progress of the project work.

8.3 The work on the project shall be initiated in the penultimate semester and continued in the final semester. The candidate can submit Project thesis with the approval of D.C. at the end of the VI semester instruction as per the schedule. Extension of time within the total permissible limit for completing the programme is to be obtained from the Head of the Institution.

8.4 The student must submit status report at least in two different phases during the project work period. These reports must be approved by the D.C before submission of the Project Work.

8.5 The viva-voce examination may be conducted for all the candidates as per the VI semester examination schedule.

8.6 Three copies of the Thesis / Dissertation are to be certified in the prescribed by the supervisor and HOD. The copies are to be submitted to the Head of the Department.

8.7 For carrying out project work, the students will be permitted to submit final report, only after securing grade of 'Very Good' or 'Good' in the internal evaluation. The student securing a grade of 'Not Satisfactory' will have to re-appear and face Internal Evaluation Committee (IEC) and secure 'Good' or 'Very Good'. Then he /she will be permitted to submit the project report. The internal project evaluation committee consisting of HOD, Supervisor and two other senior faculty members in the department. External viva voce examination shall be awarded 'Very Good', or 'Good' or 'Not Satisfactory' by a Board consisting of supervisor, HOD and an External Examiner.

9. CREDIT POINT AVERAGE (CPA) AND CUMULATIVE CREDIT POINT AVERAGE (CCPA):

9.1 For a semester/year

CREDIT POINT AVERAGE [CPA] $=\frac{1}{10}\frac{\sum_i C_i T_i}{\sum_i C_i}$

Where C_i = Credits earned for Course i in any semester/ year,

T_i = Total marks obtained for course i in any semester/year,

9.2 For the entire programme

CUMULATIVE CREDIT POINT AVERAGE [CCPA] $=\frac{1}{10}\frac{\sum_n \sum_i C_{ni} T_{ni}}{\sum_n \sum_i C_{ni}}$

n -refers to the semester in which such courses were credited

9.3 Overall Performance

CCPA	Classification of Final Result
7.0 and above	First Class with Distinction
6.0 and above but below 7.0	First Class
5.0 and above but below 6.0	Second Class

10. TRANSCRIPTS:

After successful completion of the entire programme of study, a transcript consisting performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite

fee. Partial transcript will also be issued up to any point of study to a student on request.

11. ELIGIBILITY:

A student shall be eligible for the award of M.C.A Degree, if he fulfills all the following conditions:

(i) Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.

(ii) Successfully acquired all the **164 credits** as specified in the curriculum corresponding to the branch of study within the stipulated time.

(iii) No disciplinary action is pending against him.

12. AWARD OF DEGREE:

The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapur on the recommendations of the Principal of Annamacharya Institute of Technology and Sciences (Autonomous).

13. AMENDMENTS TO REGULATIONS:

The Chairman, Academic Council of Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

14. GENERAL:

Where the words "he", "him", "his", "himself" occur in the regulations, they include "she", "her", "herself".

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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MCA COURSE STRUCTURE

First Semester MCA

Subject Code	Name of the Subject	Hrs. Per week		C	Maximum Marks		
		L	P		Internal	External	Total
4P2B11	Mathematical Foundations of Computer Science	4	0	4	40	60	100
4P2B12	Computer Programming	4	0	4	40	60	100
4P2C13	Probability and Statistics	4	0	4	40	60	100
4P2A14	Accounting and Financial Management	4	0	4	40	60	100
4P2B15	Information & Communication Technology	4	0	4	40	60	100
4P2C16	Technical Communication & Computer Ethics	4	0	4	40	60	100
4P2B17	Computer Programming Lab	0	3	2	40	60	100
4P2B18	Information & Communication Technology Lab	0	3	2	40	60	100
4P2C19	English Communication Skills Lab	0	3	2	40	60	100
Total		24	9	30	360	540	900

Note: L- Lecture; P-Practical; C – Credits.

MCA COURSE STRUCTURE

Second Semester MCA

Subject Code	Name of the Subject	Hrs. Per week		C	Maximum Marks		
		L	P		Internal	External	Total
4P2B21	Computer Organization	4	0	4	40	60	100
4P2B22	Business Data Processing	4	0	4	40	60	100
4P2C23	Numerical Methods	4	0	4	40	60	100
4P2C24	Operations Research	4	0	4	40	60	100
4P2A25	Organization Structure & Personal Management	4	0	4	40	60	100
4P2B26	Data Structures	4	0	4	40	60	100
4P2B27	Assembly Language Programming Lab	0	3	2	40	60	100
4P2B28	COBOL Lab	0	3	2	40	60	100
4P2B29	Data Structures Lab	0	3	2	40	60	100
Total		24	9	30	360	540	900

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MCA COURSE STRUCTURE

Third Semester MCA

Subject Code	Name of the Subject	Hrs. Per week		C	Maximum Marks		
		L	P		Internal	External	Total
4P2B31	Database Management Systems	4	0	4	40	60	100
4P2B32	Computer Communications	4	0	4	40	60	100
4P2B33	Network Programming	4	0	4	40	60	100
4P2B34	Java Programming	4	0	4	40	60	100
4P2B35	Design & Analysis of Algorithms	4	0	4	40	60	100
4P2B36	Operating Systems	4	0	4	40	60	100
4P2B37	DBMS Lab	0	3	2	40	60	100
4P2B38	Network Programming Lab	0	3	2	40	60	100
4P2B39	Java Programming Lab	0	3	2	40	60	100
Total		24	9	30	360	540	900

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MCA COURSE STRUCTURE

Fourth Semester MCA

Subject Code	Name of the Subject	Hrs. Per week		C	Maximum Marks		
		L	P		Internal	External	Total
4P2B41	Software Engineering	4	0	4	40	60	100
4P2B42	System Software	4	0	4	40	60	100
4P2B43	Advanced Java for Web Technologies	4	0	4	40	60	100
4P2B44	Data ware Housing and Data Mining	4	0	4	40	60	100
	Elective I	4	0	4	40	60	100
	Elective II	4	0	4	40	60	100
4P2B47	Software Engineering Lab	0	3	2	40	60	100
4P2B48	Web Technologies Lab	0	3	2	40	60	100
4P2B49	Data Ware Housing and Data Mining Lab	0	3	2	40	60	100
Total		24	9	30	360	540	900

Elective I

4P2B4A	Cloud Computing
4P2B4B	Computer Graphics and Multimedia
4P2B4C	Software Project Management

Elective II

4P2B4D	Distributed Data bases
4P2B4E	Artificial Intelligence
4P2B4F	Management Information Systems

MCA COURSE STRUCTURE

Fifth Semester MCA

Subject Code	Name of the Subject	Hrs. Per week		C	Maximum Marks		
		L	P		Internal	External	Total
4P2B51	Research Methodology	4	0	4	40	60	100
4P2B52	.Net Technologies	4	0	4	40	60	100
4P2B53	Object Oriented Modeling and Design with UML	4	0	4	40	60	100
4P2B54	Open Source Software	4	0	4	40	60	100
	Elective III	4	0	4	40	60	100
	Elective IV	4	0	4	40	60	100
4P2B57	.Net Technologies Lab	0	3	2	40	60	100
4P2B58	UML Lab	0	3	2	40	60	100
4P2B59	Software Development Lab	0	3	2	40	60	100
Total		24	9	30	360	540	900

Elective III

4P2B5A	Big Data
4P2B5B	Soft Computing
4P2B5C	Software Architecture

Elective IV

4P2B5D	Information Security
4P2B5E	Software Testing Methodology
4P2B5F	Mobile Application Development

Sixth Semester MCA

Code	Subject	Credits
4P2B61	Project Seminar	2
4P2B62	Project Thesis / Dissertation	12

FIRST SEMESTER MCA

(4P2B11) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

UNIT-I

MATHEMATICAL LOGIC: Statements and Notations, Connectives: AND, OR, Conditional, Bi-conditional, Negation, Truth Tables, Tautology, Contradiction, Well-formed Formulas, Logical Equivalence, Equivalence Implication, Normal Forms, PREDICATES: Predicative Logic, Quantifiers, Universal Quantifiers, Free & Bound Variables, Rules of Inference, Consistency, Proof of Contradiction.

UNIT-II

RELATIONS:
Operations on Relations, Properties of Binary Relations, Equivalence, Compatibility and Partial Ordering Relations, Lattices and its Properties, Hasse Diagram, Transitive Closure, Representing Relations, Diagraph of POSET.

UNIT-III

ELEMENTARY COMBINATORICS :Basis of Counting, Enumerating Combinations & Permutations with Repetitions, Constrained Repetitions, Binomial Coefficients, Binomial Multinomial Theorems, The principles of Inclusion – Exclusion. Pigeon hole Principles and its Application.

UNIT-IV

RECURRENCE RELATION: Generating Functions & Sequences, Calculating Coefficient of Generating Function, Homogeneous Recurrence Relations: First Order, Second Order, Third and Higher Order Recurrence Relations, Inhomogeneous Recurrence Relation: First Order, Second and Higher Order.

UNIT-V

GRAPH THEORY APPLICATIONS: Representation of Graphs with Examples, Vertex, Degree, Sub Graph, Multi Graph, Simple Graph, Complete Graph, Bipartite Graph, Regular Graph, Digraph, Operations on Graphs, Euler Circuits, Hamiltonian Graphs, Chromatic Number, Planar Graphs, Trees, Spanning Trees: DFS, BFS, Minimal Spanning Trees: Prim's and Kruskal's Algorithms.

TEXT BOOKS:

1. Discrete Mathematics for Computer Scientists & Mathematicians, 2/e, J.L.Mott, A. Kandel, T.P. Baker, PHI
2. Mathematical Foundations of Computer Science, D. Chandra Sekharaiah, Prism Books.

REFERENCE BOOKS:

1. Discrete Mathematical Structures with Application to Computer Science, Tremblay, Monohar. McGraw Hill Publication.
2. Elements of Discrete Mathematics – A computer oriented approach, C.L.Liu, D.P. Mahopatra, Third Edition, TMH.

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First Semester MCA
(4P2B12) COMPUTER PROGRAMMING

UNIT-I

INTRODUCTION TO PROGRAMMING AND C LANGUAGE: History of Programming Languages, Programming Language Paradigms, Programming Language Qualities, Algorithm, Flowchart, Pseudo Code, C Character Set, Delimiters, Keywords, Constants, Identifiers and Variables, Data Types, Anatomy of a C Program, Expressions, Precedence and Associativity of Operators, Type Casting, Formatted and Unformatted I/O Statements, Storage Classes and Control Statements Arrays and Strings: Array Concept, Types of Array: One Dimensional and Multi-Dimensional Array, Introduction to String, String Representation and Initialization, Array of Strings and String Manipulation Functions.

UNIT-II

FUNCTIONS: Introduction to Function, System Defined and User Defined Function, Local and Global Variables, Parameter Passing Mechanism: Pass by Value and Pass by Reference, Scope, Recursion: Recursive Function, Pointers: Dynamic Memory Management of 'C', Declaration and Initialization of Pointers, Structures: Introduction to Structure and Union, Structure Declaration and Initialization, Nested Structure, Files: Types of File: Binary and Text File, Operations on File: Open, Close, Read, Write and Seek, Programs to Implement File, Command Line Argument and its Usage.

UNIT III

C++ BASICS: Data Abstraction, Class Specification, Class Objects, Accessing Class Members, Inline Functions, Access Control Specifiers, Friend Functions and Friend Classes, Constant Member Functions, Static Data and Member Functions, Structure of a C++ Program. Constructors and Destructors, Copy Constructor, Static Data Members with Constructors and Destructors, Nested Classes, New and Delete Operators, Dynamic Creation and Destruction of Objects.

UNIT IV

Function Overloading, Operator Overloading, Function Templates and Class Templates, Need for Virtual Functions, Definition of Virtual Functions, Pure Virtual Functions, Virtual Destructors, Dynamic Binding through Virtual Functions, Abstract Classes. Inheritance, Forms of Inheritance, Defining the Base and Derived Classes, Inheritance and Member Accessibility, Object Composition, Delegation.

UNIT V

C++ Stream Classes Hierarchy, File Streams and Console Streams, Manipulators, Overloading Operators <<and>>, File Operations, Error Handling during File Manipulation. Exception Handling Model of C++, Exception Handling Constructs, Handling Uncaught Exceptions, Benefits of Exception Handling, Rules for Handling Exceptions

TEXT BOOKS:

1. Programming Language Concepts,3rd Edition- Ghezzi, Mehdi, Jazayeri, John Wiley & Sons.
2. Mastering C+ +, K.R. Venugopal, Rajkumar & T. Ravi Shankar, Tata Mcgraw Hill.
3. Programming in C and Data Structures, J.R. Hanly, Ashok N. Kamthane, A. Ananda Rao, Pearson Education.

REFERENCE BOOKS:

1. Programming with ANSI and Turbo C – Ashok N. Kamthane, Pearson Education.
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.
3. Object Oriented Programming in C++, 4th Edition, R.Lafore, SAMS, Pearson Education.
4. Learning C++ a hands-on approach-Eric Nagler, Jaico Publishing House.

First Semester MCA

(4P2C13) PROBABILITY AND STATISTICS

UNIT-I

Probability: Sample Space and Events – Probability – The Axioms of Probability – Some Elementary Theorems - Conditional Probability – Baye's Theorem. Random Variables – Discrete and Continuous – Distribution Functions - Mean and Variance.

UNIT-II

Binomial Distribution –Poison Distribution- Uniform Distribution - Normal Distribution.

UNIT-III

Sampling Distribution: Population and Sample - Sampling Distributions of Means (σ known and unknown). Estimation: Point Estimation – Interval Estimation - One Mean –Two Means (large sample) and One Proportion – Two Proportions (large sample).

UNIT-IV

Test of Hypothesis – Large Samples: Hypothesis Concerning One and Two Means. Test of Proportions (one and two).Small Samples: t- test, F-test.

UNIT-V

χ^2– Tests –goodness of fit, ANOVA for one- way and two-way classification data

TEXT BOOKS:

Probability and Statistics for Engineers (Miller& Freund's), Richard A Johnson, 7th Edition, PHI

REFERENCEBOOKS:
1. Probability and Statistics for MCA, T.K.V.Iyengar, B.krishna Gandhi, S.Ranganathan, M.V.S.S.N.Prasad, S.Chand and Company Ltd.
2. Probability and Statistics, B. V. Ramana, Tata McGraw Hill.

First Semester MCA
(4P2A14) ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT I

INTRODUCTION TO ACCOUNTING: Principles, Concepts and Conventions, Basics of accounts, Double entry system of accounting, Classification of accounts and debit-credit rules. Introduction to basic books of accounts, Journal and Ledger – Trial balance – Preparation of final accounts: Trading account, Profit and Loss account and Balance sheet with adjustments (with simple illustrations)

UNIT II

BREAK EVEN ANALYSIS - Introduction, Definition, meaning and BEP analysis and BEP in units. Concept of Break Even Point, Cost-Volume-Profit Analysis, Determination of Break Even Point, Margin of Safety and P/V ratio, Practical applications of Break Even Analysis, Simple problems.

UNIT III

FINANCIAL ANALYSIS THROUGH RATIOS: Ratio Analysis meaning –advantages and disadvantages, Classification of ratios – Analysis and interpretation of financial statements through ratios of liquidity, Solvency and Profitability.

UNIT IV

INTRODUCTION TO FINANCIAL MANAGEMENT: Time value of money-Present Value of Money-Future Value of Money. Financial management Definition-scope, Objectives of financial management, Sources of finance.

UNIT V

CAPITAL BUDGETING: Features, Proposals, Methods of capital budgeting, Payback method, Accounting rate of return (ARR), Net Present Value Method (NPV) and Internal Rate of Return (IRR) -Simple problems.

Text Books

1. Financial Accounting: S.N.Maheshwari, Sultan Chand, 2009.
2. Management Accounting: Theory and Practice, Pandikumar M.P 1st edition, Excel Books, 2007.
3. Financial Management and Policy, Van Horne, James.C. Pearson, 2009.
4. Management Accounting, Khan My, Jain P.K, 4th Edition, Tata McGraw Hill, 2007.
5. Financial Accounting, Tulsian, S Chand, 2009.
6. Financial Statement Analysis, Khan and Jain, PHI, 2009
7. Financial Management, I.M.Pandey, Vikas Publications.
8. Financial Management, Prasanna Chandra, T.M.H, 2009.

First Semester MCA

(4P2B15) INFORMATION & COMMUNICATION TECHNOLOGY

UNIT I

BASIC STRUCTURE OF COMPUTERS: Computer types, Functional Units, Basic Operational concepts, Bus structure, Software, Performance, Multiprocessors and Multicomputer and Historical Perspective, Generation of Programming Languages – Machine Languages, Assembly Language, High-level Programming, Fourth Generation Languages, Fifth Generation Languages.

UNIT II

SEMICONDUCTOR MEMORIES: SRAM, DRAM, SDRAM, ROM, PROM, EEPROM, Flash Memory and Cache Memory, SECONDARY STORAGE DEVICES: Magnetic Hard Disks, Optical System and Magnetic tape systems.

UNIT III

DISCRETE COMPONENTS OF COMPUTER: Mother Board, Cabinet, Memory, Processor and Peripherals, Configuring a Computer System COMPUTER PERIPHERALS: Input Devices, Output Devices, Serial Communication Links and Standard I/O Interfaces: PCI, SCSI and USB.

UNIT IV

COMPUTER NETWORKS: History of Networks, Types of Networks: LAN, MAN, WAN, Intranet, Internet, Extranet, Network Topologies.
Network Components: Transmission Media, NIC Hubs, Switches, Bridges, Routers, Gateways, Modems.

UNIT V

Introduction to OSI Reference Model, Introduction to TCP/IP: Layers, IP, ARP, RARP, ICMP, TCP, UDP, DNS, Email, FTP, TFTP, WWW, HTTP and Telnet
WEB TECHNOLOGY: Dynamic Web Pages, Active Web pages and XML

TEXT BOOKS:

1. Carl Hamacher, Zvonko Vranesic and Safat Zaky, Computer Organization, 5/e. Mc Graw-Hill International Edition 2002.
2. Achut S Godbole and Atula Kahate, Web Technologies: TCP/IP to Internet Applications Architectures, Tata McGraw-hill, 2003.
3. Peter Norton, Introduction to Computers, 6/e, Tata McGraw Hill, 2006.

First Semester MCA

(4P2C16) TECHNICAL COMMUNICATION & COMPUTER ETHICS

Unit I:

Basics of Technical Communication -Introduction, Process of Communication, Language as a Tool, Levels of Communication, Communication Networks, Importance of Technical Communication.

Active Listening: Introduction, Types of Listening, Traits of good Listener, Active versus passive listening, implications of effective listening; **Barriers to Communication:** Definition of Noise, Classification of Barriers.

Unit II:

Technology in Communication: Impact of Technology, Software for Creating Messages, Software for Writing Documents, Software for Presenting Documents, Transmitting Documents, Effective use of Available Technology

The Importance of Non-Verbal Communication: Kinesics, Proxemics, Paralinguistic, and Chromatics

Effective Presentation Strategies: Introduction, Defining purpose, Analyzing Audience and Locale, Organizing Contents, preparing outline, Usage of Visual Aids, Understanding Nuances of Delivery

Unit III:

Group Communication: Introduction, Group Discussion, Organizational Group discussion. Group discussion as part of selection process Meetings, conferences

Interviews: Introduction, Objectives, Types of Interviews, Job Interviews. **Resume Writing:** Format and Style, Sample Resumes

Unit IV:

Overview of Ethics: What are Ethics? Ethics in the Business World, Ethics in Information Technology (IT)

Ethics for IT Professionals and IT users: IT professionals, The Ethical behavior of IT professionals, IT Users

Unit V:

Privacy: Privacy Protection and the Law, Key Privacy and Anonymity Issues

Software Development: Strategies to Engineer Quality s/w, Key Issues, Case study.
Employer/Employee Issues Use of Non-traditional workers, Whistle Blowing

Text Books:

1. **Technical Communication, Principles and Practices,** Meenakshi Raman and Sangeeta Sharma, Oxford University Press, 2004
2. **Ethics in Information Technology,** George Reynolds, Thomson Course Technology, 2003

Reference Books:

- Effective Technical Communication, M Ashraf Rizvi, TMGH Publications
- Ethics in Engineering, Mike W Martin and Ronal Schinzinger, 3rd edition, Tata McGraw Hill, 2003

First Semester MCA

(4P2B17) COMPUTER PROGRAMMING LAB

1. C program that implement the expression, typecasting statements in the presence of decision statements and loop statements.
2. C program that implement one dimensional array operations on integer and float data values.
3. C program that implement library function to perform various String operations.
4. C program that implement manipulation of string without library function.
5. C program that implement function and parameters of array, string, float and integer data types and test different parameter passing mechanisms.
6. C program that implement function to perform string operations
7. C program that implement recursive function
8. C program process one dimensional array using pointer.
9. C program process two dimensional array using pointer.
10. C program that implement file operations on text file.
11. C++ program implements function with default argument and variable number of arguments.
12. C++ program that contains all access control specifiers, Static members and copy constructor.
13. C++ program that creates class objects dynamically and pass objects to a function.
14. C ++ program that implement function overloading
15. C++ program that demonstrates operator overloading and uses simple data types, string and manipulation of Objects.
16. C++ program that demonstrates the purpose and usage of function template and class template.
17. C++ program that demonstrates the dynamic binding through virtual functions.
18. C++ program that demonstrates the
    1. Multilevel inheritance
    2. Hybrid inheritance
    3. Hierarchical inheritance
    4. Simple inheritance
    5. Multipath inheritance
19. C++ program that demonstrate the behavior of access specifies in the presence of inheritance.
20. ++ program that demonstrates the working of Object composition and delegation
21. C++ program to perform file operations using file streams and error handling mechanism.

First Semester MCA

(4P2B18) INFORMATION & COMMUNICATION TECHNOLOGY LAB

TASK 1: Introduction to Computer's, Advantages and Disadvantages of computers Draw the block diagram of computer.

TASK 2: Identify the peripherals of a computer like Input and Output Devices.

TAKS 3: Identify the Components of a CPU and their function, components with the configuration of each peripheral device is to be submitted to your instructor.

TASK 4: Every student should dissemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a viva.

TASK 5: Demonstrate an experiment for testing the hardware failures in a Computer.

TASK 6: Demonstrate an experiment for testing the software failures in a Computer.

TASK 7: Identify the components of network like Network Interface Cards, Hubs, Switches, Bridges, Routers, Gateways, Modems and Transmission Media.

TASK 8: Students should get connected to their Local Area Network and access the internet. In the process they configure the TCP/IP setting.

TASK 9: Students should do BIOS settings for configuration of system. For example student can change booting option.

TASK 10: Demonstrate how to access the website and how to use the search engines. A few topics would be given to the students for which they need to search on Google.

TASK 11: Demonstrate how to create email ids for sending mails with attachments and show down loading procedure files.

TASK 12: Develop a static web page using frames, tables, forms, lists, hyperlinks, images etc.

TASK 13: Develop a dynamic web page based on task 11 by using JavaScript for performing basic validations.

TASK 14: Develop a well formed XML page for storing employee/student/some other information.

TASK 15: Demonstrate the usage of TELNET.

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First Semester MCA

(4P2C19) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Syllabus:
The following course content is prescribed for the English Language Laboratory
Practice

1. **Phonetics- Introduction to the Sounds of English – vowels, Diphthongs and consonants**
2. **Situational Dialogues/Role play**
3. **Reading Comprehension**
4. **Oral Presentations/Public speaking**
5. **Group Discussion**
6. **Interviews**
7. **Resume**
8. **Listening Comprehension**

Lab Manual cum Record: Manual cum Record prepared by the teachers will be used by the students during laboratory hours

SUGGESTED SOFTWARE:

- Sky Pronunciation Suite
- Clarity Pronunciation Power 1
- Active Listening from Clarity
- Active Reading from Clarity
- It's your Job from Clarity G
- Globarena Career Lab
- Cambridge Advanced Learners' Dictionary with exercises
- Oxford Advanced Learner's Compass, 7th Edition

BOOKS SUGGESTED FOR ENGLISH LAB:
- Developing Communication Skills by Krishna Mohan &MeeraBenerji (Macmillan)
- Speaking English Effectively by Krishna Mohan & NP Singh (Macmillan)
- Oxford Practice Grammar with Answers, John Eastwood, Oxford
- Handbook of English Grammar and Usage, Mark Lester and Larry Beason, Tata McGraw-Hill
- A text book of English Phonetics for Indian Students by T. Bala subramanian (Macmillan)
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- English Skills for Technical Students, WBSCTE with British Council, OL
- Everyday Dialogues in English by Robert J Dixson, Prentice – Hall of India Ltd.
- Professional Communication by Koneru, McGraw Hill.

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Second Semester MCA

(4P2B21) COMPUTER ORGANIZATION

UNIT I

NUMBER SYSTEMS AND COMPUTER ARITHMETIC: Signed and unsigned numbers, complements, Addition and subtraction, Multiplication, Division, Floating point representation, Gray code, BCD codes, Boolean algebra, Simplification of Boolean expressions, K-Maps. Combinational and Sequential Circuits: Decoders, Encoders, Multiplexers, Half and Full adders, Sequential circuits, Flip-flops.

UNIT II

MEMORY ORGANIZATION: Memory hierarchy, Main memory-RAM, ROM chips, Memory address map, Memory contention to CPU, Associative Memory-Hardware logic, Match, Read and Write logic, Cache Memory-Associative mapping, direct mapping, Set-associative mapping.

UNIT III

BASIC CPU ORGANIZATION: General Register Organization, Stack Organization, Instruction Formats- Zero, one, two, and three address instructions, Instruction formats-INTEL-8086 CPU Architecture, Addressing modes.

UNIT IV

INTEL 8086 ASSEMBLY LANGUAGE INSTRUCTIONS: Data transfer instructions, Input-Output instructions, Flag transfer, arithmetic, logical, shift and rotate instructions, Conditional and unconditional transfer, Iteration control, Interrupts, Assembler directives, Programming with assembly language instructions.

UNIT V

MICRO PROGRAMMED CONTROL: Control Memory, Address Sequencing, Micro program example, Design of Control Unit, Input-Output Organization: Peripheral devices, Modes of transfer, Priority interrupts - Daisy chaining, parallel priority, DMA- DMA control, DMA transfer, Input output processor-CPU-IOP communication.

TEXT BOOKS:

1. Computer System Architecture, M. Morris Mano, 3rd Edition, PHI/Pearson Education, 2008.
2. Fundamentals of Computer Organization and Design, Sivarama P.Dandamudi, Springer Int. Edition.
3. Assembly Language programming, Peter Albert.

REFERENCE BOOKS:

1. Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 5th Edition, McGraw Hill.
2. Computer Organization and Architecture, William Stallings, 7th Edition, Pearson/PHI, 2007
3. Intel 8086 programming, V. Douglas Hall, Tata McGraw-Hill.

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Second Semester MCA

(4P2B22) BUSINESS DATA PROCESSING

UNIT I

INTRODUCTION: History of COBOL, Basic Structure of a COBOL Program, Coding format for COBOL programs, Character Set, COBOL Words, Data names and Identifiers, Types of Data, IDENTIFICATION DIVISION- Paragraphs in the IDENTIFICATION DIVISION, ENVIRONMENT DIVISION- Sections of the ENVIRONMENT DIVISION, and Assigning Files to devices in the ENVIRONMENT DIVISION.

UNIT II

DATA DIVISION: The file section of the DATA DIVISION, The Working-Storage Section of the DATA DIVISION, Procedure Division – DISPLAY and ACCEPT Statements, Moving data and printing information, computing in COBOL: The Arithmetic verbs, DECISION MAKING: Decision making using the IF and EVALUATE statements, Basic PERFORM Statement, Alter statement, Exit Statement, Conditional Statements.

UNIT III

DIFFERENT TYPES OF CLAUSES AND VERBS : Usage Clause, Synchronized Clause, Justified Clause, Redefines Clause and Renames Clause, Sign Clause, Text Manipulation with the STRING and UNSTRING Statement, Interactive Processing using SCREEEN Section.
ARRAY PROCESSING AND TABLE HANDLING: Different Types of PERFORM Statement, Single-Level Arrays and Tables, Multiple-Level Arrays and Tables.

UNIT IV

WORKING WITH FILES IN COBOL:
SEQUENTIAL FILE PROCESSING, SORTING AND MERGING: Sequential File Processing: Systems overview of Sequential File Processing, Sequential File Updating, Sorting and Merging: The SORT Feature, The MERGE Statement and Sample Programs, INDEXED AND RELATIVE FILE PROCESSING: Indexed File Processing: Systems Considerations for Organizing Disk Files, Processing Indexed Disk Files, and Relative File Processing: Processing Relative Disk Files.

UNIT V

REPORT WRITER AND SUBROUTINES: Report writer: Benefits of Report Writing Module, The Report Section in the Data Division, Procedure Division Statements. Subroutines: Structure of a COBOL Subroutine, COPY and CALL Statement, Advantages and Disadvantages of COBOL Subroutines.

TEXT BOOKS:

1. COBOL Programming including MS COBOL and COBOL-85, M K Roy and D Ghosh Dastidar, 2nd Edition, Tata McGraw Hill, 2001.
2. Structure COBOL Programming, Nancy Stern and Robert A Stern, 8th Edition, John Wiley & Sons, 2008.

REFERENCES:

1. Structured COBOL Programming, Fray B Shelly, Thomas J Cashman, Roy O Foreman, 2nd Edition, Thomson Course Technology, 1999.
2. Introduction to COBOL, A Guide to Modular Structured Programming, David M. Collopy, 1st Indian Reprint, Pearson Education, 2005

Second Semester MCA

(4P2C23) NUMERICAL METHODS

UNIT-I Approximations and Errors in Computations: Accuracy of numbers – Errors – useful rules for estimating errors – Error propagation – Error in the approximation of a function – Error in a series approximation, **Solution of algebraic and transcendental equations:** Bisection method – method of false position – secant method – Newton Raphson method – Muller's method.

UNIT-II Solutions of linear simultaneous algebraic equations – Gauss eliminating method – Factorization Method – Jacobi's method – Gauss Seidal method – relaxation method - Eigen values and Eigen vectors using power method.

UNIT-III CURVE FITTING: The method of least squares – fitting of linear and nonlinear curves - Coefficient of Correlation - Linear Regression– multiple regressions.

UNIT-IV INTERPOLATION: Introduction – Newton's forward and backwards interpolation formulae – Gauss's forward and backwards interpolation formulae – Sterling's and Bessel's formulae.

UNIT-V
Numerical solution of Ordinary Differential equations - Taylor's series - Euler's Method – Picard's Method - Runge-Kutta Fourth Order Method – Milne's Predictor-Corrector Method

TEXT BOOKS:

Numerical Methods in engineering and science with programs in C &C++, B.S Grewal, 9th Edition, Khanna Publishers

REFERENCE BOOKS:

1. M K Jain, S.R.K.Jain, R.K.Jain: Numerical Methods for Scientific and Engineering Computation, 5th edition, New Age International Publishers.
2. Veerarjan and Ramachandran, Numerical Methods with programs in C, Tata McGraw Hill.

3. Numerical Mathematics and Computing by Ward Cheney and David Kincaid, 5th edition, Thomson Publications.

Second Semester MCA

(4P2C24) OPERATIONS RESEARCH

UNIT I

Introduction to Operations Research-Basic definition, Scope, Objectives, Phases, Models and Limitations of Operations Research, Linear Programming Problem – Formulation of LPP, Simplex Method, Big-M method, Two-phase Method, Degeneracy and Unbound solutions, Revised simplex method, Duality, Dual simplex method.

UNIT II

Transportation Problem – Formulation, Unbalanced Transportation problem, Finding basic feasible solutions - Northwest corner rule, least cost method and Vogel's approximation method, Optimality test –MODI method, Assignment model – Formulation, Hungarian method for optimal solution, Solving unbalanced problem, Travelling salesman problem as assignment problem.

UNIT III

Sequencing models : Solution of Sequencing Problem – Processing n Jobs through 2 Machines – Processing n Jobs through 3 Machines – Processing 2 Jobs through m machines Processing n Jobs through m Machines.

UNIT IV

Replacement Models: Individual replacement policy, Group replacement policy, Game Theory: Competitive games, Rectangular game, Saddle point, Minimax (Maximin) method of optimal strategies, Value of the game, Solution of games with saddle points, Dominance principle, Rectangular games without saddle point – mixed strategy for 2 X 2 games.

UNIT V

Inventory models: Inventory costs, Models with deterministic demand – model (a) demand rate uniform and production rate infinite, model (b) demand rate non – uniform and production rate infinite, model (c) demand rate uniform and production rate finite.

TEXT BOOKS:

1. Operations Research, A.M. Natarajan, P. Balasubramani, A. Tamilarasi, Pearson Education, 2005.
REFERENCES
1. Operations Research, R. Panneerselvam 2/e, PHI 2008
2. Operations Research, P.K. Gupta and D.S. Hira, S.Chand & CO., 2007

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Second Semester MCA

(4P2A25) ORGANIZATION STRUCTURE AND PERSONAL MANAGEMENT

UNIT I

INTRODUCTION TO MANAGEMENT: Concepts of Management and organization – Nature, Importance, Functions and theories of management, Systems approach to management, leadership styles, and Social responsibilities of management. Introduction to Organization: Designing Organizational structures: Basic concepts related to Organization – Department and Decentralization, Types and structures of organization.

UNIT II

DECISION PROCESS APPROACH: Parts of organization system, Dynamics of decision, Role of system, Personnel Management: Evolution, Objectives, Personnel Policies, Personnel management vs HRM, Position of the personnel department in the organization, Role of personnel manager as line manager and staff manager.

UNIT III

MAN POWER PLANNING: Need-strategies and limitations, Manpower inventory, Manpower forecasting, Job description, Recruitment, Job specification and selection, Interviewing techniques, Transfers and promotion policies, Training And Development: Objectives and policies planning, Organizing the training department, Training manager and his job, on and off the job training techniques, Career planning, Objectives of performance appraisal.

UNIT IV

COMMUNICATION: Importance of communication, Interpersonal communication, Barriers of communication, Communication in organizations, Using communication skills to manage conflicts, Personality– Transactional Analysis, Perception: Perceptual process, Development of Attitudes and Values, Team Effectiveness.

UNIT V

CONTEMPORARY STRATEGIES: Total Quality Management (TQM), Six sigma, People Capability Maturity Model (PCMM) levels, Performance management, Business Process Outsourcing (BPO), business process re-engineering, bench marking and balanced score card.

TEXT BOOKS:

1. Dr. LM Prasad, "Principles & Practice of Management", 7e, S.Chand series.
2. Organization Structure and Personnel Management, P.Subbarao HPH, 2009.
3. Organizational Behavior, Aswathappa.K: Himalaya Publishers.

REFERENCES:

1. Industrial Business Management, Martand T Telsang, S.Chand.
2. Human Resources Management, Dr L.M.Prasad, S.Chand.
3. Dynamic Personnel Administration, Rudrabasavaraj MN, Himalaya.
4. Personnel Management, Mamoria & Gankar, HPH, 2009.

Second Semester MCA

(4P2B26) DATA STRUCTURES

UNIT I

INTRODUCTION TO DATA STRUCTURES: Fundamentals of Data Structures, classification of data structures, Algorithm Analysis – Asymptotic notation – Efficiency classes – Mathematical analysis of Non recursive algorithm - Mathematical analysis of recursive algorithm.

UNIT II

ARRAYS, LISTS, STACKS AND QUEUES: Arrays: Implementation – Operations- Applications Linked List: Implementation – Operations- Applications Stack: Implementation – Operations - Applications, Queues: Implementation – Operations - Applications, Hash Table – Hash Function – Open Hashing – Closed Hashing.

UNIT III

SORTING, SEARCHING: Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Radix Sort and Quick Sort, Searching: Linear Search, Binary Search, and Fibonacci Search.

UNIT IV

NON LINEAR DATA STRUCTURES AND HASH TABLES
Introduction- Definition and Basic terminologies of trees and binary trees- Representation of trees, Binary tree Traversals- Threaded binary trees- Hash Tables: Introduction- Hash Tables- Hash Functions and its applications, Closed hashing, comparison of collision resolution techniques.

UNIT V

ADVANCED TREES: Graphs- basic concepts –- representation and traversals. Introduction-Binary Search Trees: Definition- Operations and applications. Height Balanced Trees, AVL Trees: Definition- Operations and applications, B Trees: Definition- Operations and applications, Red – Black Trees- Splay Trees and its applications.

TEXT BOOKS:

1. Samanta.D, "Classic Data Structures", Prentice Hall of India (PHI).

REFERENCES:

1. Mark Allen Weiss, "Data Structures and Problem Solving using C++", The Benjamin Cummings / Addison Wesley Publishing Company, 2002
2. Pai G.A.V., "Data Structures and Algorithms", TMH, 2009,
3. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran "Fundamentals of Computer Algorithms", 2nd edition, University Press, 1996

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Second Semester MCA

(4P2B27) ASSEMBLY LANGUAGE PROGRAMMING LAB

Write Assembly Language Programs for the following using MASM.

1. Write an ALP of 8086 to take a string as input and do the Following Operations on it.

   a. Find the length
   b. Find it is Palindrome or not
   c. Find whether given string is substring or not.
   d. Reverse a string
   e. Concatenate by taking another string

2. Write an ALP of 8086 to take N numbers as input and do the following operations on them.
   a) Arrange in ascending and descending order.
   b) Find max and minimum

3. Write the ALP to implement the above operations as procedures and call from the main procedure.

4. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main Program which display the result.

5. Write an assembly language program to read a string of characters from the user and that prints the vowel count.

Example: Input: Advanced Programming in UNIX
             Output:
              Vowel   *count*
              a or A   3
              e or E   1
               i or I   3
              o or O   1
              u or U   1

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Second Semester MCA

(4P2B28) COBOL LAB

Develop the Programs using the following concepts:

1. Using Arithmetic Verbs, MOVE Verb, ACCEPT Verb, DISPLAY Verb and COMPUTE Verb
2. Control Statements and Perform Statements
3. Table handling facilities
4. Create and process Sequential Files and to Process Master files using Transaction Files
5. Sort a File, Merge two Files and Search a File for a given record using search verb
6. Create and Process an Indexed File
7. Create and Process a Relative File
8. Program using subroutines
9. Program using report generator

Second Semester MCA

(4P2B29) DATA STRUCTURES LAB

1. Program to perform the operations on Arrays.
2. Program to perform the operations on single linked list
3. Program to perform the operations of Double linked list
4. Program to perform the operations of double linked list using primitive data or structure data. Use dynamic representation of linked list.
5. Program to perform the operations of circular double linked list using primitive data or structure data. Use dynamic representation of linked list.
6. Program that demonstrates the polynomial manipulation using linked list.
7. Program to implement stack data structure using array representation.
8. Program to implement stack data structure using linked list representation.
9. Program to convert given infix expression to post fix expression.
10. Program to evaluate the given post fix expression.
11. Program to demonstrate the recursion implementation using stack.
12. Program to perform the operations of simple Queue. Use array representation.
13. Program to perform the operations of simple Queue. Use linked list representation.
14. Program to perform the operations of circular Queue. Use linked list/array representation
15. Program to perform the operations of De-queue. Use linked list/array representation
16. Program to perform the operations insert a node, delete a node, search and traverse using Binary Search Tree.
17. Program to accept a set of integer or float or string values and construct a Binary Search Tree then search for a given element.
18. Program to construct a Heap tree and sort the values.
19. Program to demonstrate the implementation of Priority Queue using Heap Tree.
20. Program to perform the operations insert a node, delete a node, search and traverse using Height Balanced Tree.
21. Programs to demonstrate the following Searching techniques using integer or float or string or structure data.
    1. Binary search
    2. Fibonacci search

Third Semester MCA

(4P2B31) DATABASE MANAGEMENT SYSTEMS

UNIT I

INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS: Data Vs Information, Purpose of databases, Views of data, Database languages, Data models, Database architecture - users and administrators. E-R Model, Entity-Relationship diagrams, E-R diagrams design issues, Extended E-R features, Specialization, Generalization, Aggregation.

UNIT II

RELATIONAL MODEL: Structure of Relational database, Relational Algebra, Tuple relational calculus, Domain relational calculus, QBE (Query-by-Example), Data log.

UNIT III

STRUCTURED QUERY LANGUAGE (SQL): Introduction to SQL, SQL Operators, SQL Functions, Join queries, Sub queries, Nested queries, Views, Integrity constraints, Database design - Normalization: Normal Forms-1st, 2nd, 3rd and BCNF, Functional Dependencies, Multi - Valued Dependency-4th Normal Form, 5th NF/Projection-Join Normal form and De-Normalization.

UNIT IV

TRANSACTION MANAGEMENT: Transaction concept, ACID properties, Transaction state, concurrent execution, Concept of Serializability and Testing for Serializability, Recovery System: Storage structure, Recovery and atomicity, Log-Based Recovery, ARIES Recovery Technique and Remote Back systems.

UNIT V

STORAGE AND FILE STRUCTURE: Overview of Physical Storage media , Magnetic Disks, RAID, File Organization, Organization of Records in Files and Data-Dictionary Storage, Indexing and Hashing: Ordered Indices, B+-Tree Index Files, B-Tree Index files, Multiple-key access, Static and Dynamic Hashing, Bitmap indices.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan. Database system Concepts. McGraw Hill International Edition, 2006, 5th Ed.
2. Elmasri, Navate, Fundamentals of Database Systems, Person Education, 2008.

REFERENCES:

1. C.J Date,Introduction to Database Systems, Pearson Education, 2009.
2. S.Shah and V. Shah SPD,Oracle for Professionals, The X team, 2010.
3. PS Deshpande, SQL/PLSQL for Oracle 9i , dreamtec Press, 2007.
4. Raghurama Krishna, Johannes Gehrke, Database management systems, TMH.

Third Semester MCA

(4P2B32) COMPUTER COMMUNICATIONS
UNIT I

INTRODUCTION: Applications of Networks, Network hardware, Network Software, Reference Models-OSI Reference model, TCP/IP Reference Model, OSI versus TCP/IPMULTIPLEXING AND SWITCHING TECHNIQUES: Frequency division Multiplexing, Synchronous Time division multiplexing, Statistical time division multiplexing, Circuits switching: Packet switching, Circuit-switch networks, Packet-switching principles, x.25, Frame relay.

UNIT II

DATA LINK LAYER: Data Link layer design issues, Framing, Error control, Flow control, Error Detection and Correction, Elementary data link protocols, Sliding Window protocols
MEDIUM ACCESS CONTROL: Channel allocation, Multiple access protocols-Aloha, CSMA, collision free protocols, Limited-Contention Protocols, Ethernet-Manchester Encoding, Back-off algorithm, Wireless LANs.

UNIT III

NETWORK LAYER : Network layer design issues, Routing Algorithms-the Optimality Principle, Shortest path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcasting routing and Congestion control algorithms, INTERNETWORKING: Connectionless versus connection oriented Tunneling, Internetwork Routing, Fragmentation, IP Protocol, IP Address Internet multicasting.

UNIT IV

TRANSPORT LAYER: Transport Services, Internet transport protocols- UDP, TCP, Wireless and Mobile Networks: Wireless Links and Network Characteristics, CDMA, Wi-Fi: 802.11 Wireless LANs, Architecture, MAC layer, Frame, IP Subnet, Bluetooth and Mobile IP

UNIT V

NETWORK SECURITY: Cryptography, Symmetric-key algorithms-DES, AES, Public-key algorithms-RSA, Digital Signatures, Authentication Protocols-Kerberos and e-mail security-PGP, PEM

TEXT BOOKS:

1. Andrew S. Tanenbaum. Computer Networks, Pearson education, 2009, 4th Ed.
2. James F. Kurose, Keith W. Rose. Computer Networks- A Top-Down Approach Featuring the internet, Pearson education, 2009.

REFERENCE BOOKS:

1. S. Keshav. An engineering Approach to Computer Networking, ATM Networks, the Internet and the Telephone Network. Pearson education, 2009.
2. Williams Stallings. Data and Computer Communication. PEA, 2003, 7th Ed.
3. Nadir F. Mir, Computer and Communication Networks. Pearson Education, 2009.

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Third Semester MCA

(4P2B33) NETWORK PROGRAMMING
UNIT I

INTRODUCTION: Linux/UNIX Operating System; The Linux/UNIX Architecture; Features of Linux/UNIX; POSIX standard; Locating Commands: ; General Purpose Utilities:; Unix file system; Navigating the File System and Relative pathnames; Handling Ordinary Files; The Process basics, , time commands; Filters: grep, Regular Expression, egrep, fgrep.

UNIT II

ESSENTIAL SHELL PROGRAMMING AND FILE PROCESSING: shell variables; shell constants; command substitution; parameter substitution; shell meta characters; shell commands: test, control structures, arithmetic in shell, shell functions, input and output redirection, pipes and tee; FILE PROCESSING: File types, FILE stream, Standard I/O , file descriptor, system calls for file processing; File permissions and Security, System calls (chmod, chown), Directory management system calls .

UNIT III

LINUX / UNIX PROCESSES I: The Environment of a Process, main function, Process Termination, Memory Layout of a C Program, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions, LINUX / UNIX PROCESSES II: Process Identifiers, fork, vfork, exit, wait, waitpid, waitid, wait3, wait4 functions, Race Conditions, exec functions, system Function, Process Accounting, User Identification, process Times, Terminal Logins, Network Logins, Process Groups, Sessions, Controlling Terminal, tcgetpgrp, tcsetpgrp, and tcgetsid Functions.

UNIT IV

SIGNALS: Signal types, Kernel Support for Signals, Signal function, signal mask, sigaction function. The sigsetjmp and siglongjmp Functions, kill, alarm, raise, pause, sigpause functions.

UNIT V

INTERPROCESS COMMUNICATION: Introduction; Pipes, pipe, popen Functions, Co-processes; FIFOs; XSI IPC; Message Queues; Semaphores, shared memory, Sockets: Introduction; Socket Descriptors; Addressing; Connection establishment; Data transfer system calls; Implementation of TCP/IP and UDP.

TEXT BOOKS:

1. W.Richard Stevens, Stephen A. Rago. Advanced Programming in the UNIX Environment, Pearson Education / Prentice-Hall of India, 2005, 2nd Ed.
2. Sunitabha Das, UNIX concepts and applications −2010.

REFERENCE BOOKS:

1. Terrence Chan. UNIX System Programming Using C++. Prentice-Hall of India / Pearson Education, 1999.
2. Marc J. Rochkind. Advanced UNIX Programming. Pearson Education, 2005, 2nd Ed.
3. Maurice. J. Bach. The Design of the UNIX Operating System. Pearson Education / PHI, 1987.
4. Uresh Vahalia. UNIX Internals. Pearson Education, 2001.

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Third Semester MCA
(4P2B34) JAVA PROGRAMMING

UNIT I

CLASSES AND OBJECTS : concepts of classes, objects, methods, access control, this keyword, garbage collection, simple java program, constructors, parameter passing, recursion, Enumeration, Auto-boxing: Enumeration, Type Wrappers, Auto boxing. Generics: What are Generics?, A Simple Generics Example, A Generics Class with two Type Parameters, The General Form of a Generic Class. String Handling: The String Constructors, String Length, Special String Operations, Character Extraction, String Comparison, Searching Strings, Modifying a String, Data Conversion Using valueOf ( ), Changing the Case of Characters Within a String, Additional String Methods, String Buffer, String Builder.

UNIT II

INHERITANCE : Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance, Member access rules, super keyword and its uses, using final with inheritance, polymorphism- method overriding, abstract classes, Method overloading, Inner Classes-Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

UNIT III

PACKAGES AND INTERFACES : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, Interfaces vs Abstract classes, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring packages –java.util.

UNIT IV

EXCEPTION HANDLING AND MULTITHREADING: Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups

UNIT V

FILES-STREAMS: Byte Streams, Character Streams, text Input/output, Binary input/output, random access file operations, File management using file class, using java.io, NETWORKING: Basics of network programming, addresses, ports, sockets, Socket connection and simple client server program, multiple clients, Java .net package,

TEXT BOOKS:

1. Herbert schildt, Java. The complete reference. TMH, 2010, 7th Ed.
2. T. Budd. Understanding OOP with Java. Pearson education, 2008, Updated Ed.

REFERENCE BOOKS:

1. J.Nino and F.A. Hosch. An Introduction to programming and OO design using Java. John Wiley and sons, 2004.
2. T. Budd. An Introduction to OOP. Pearson education, 2009, 2nd Ed.
3. Y. Daniel Liang. Introduction to Java programming. Pearson education, 2010, 6th Ed.
4. R.A. Johnson. An introduction to Java programming and object oriented application development. Thomson, 2009.

Third Semester MCA
(4P2B35) DESIGN AND ANALYSIS OF ALGORITHMS

UNIT I

INTRODUCTION: Algorithm, Pseudo code for expressing algorithm, Fundamentals of algorithmic problem solving, asymptotic notations, Recurrence equations – Solving recurrence equations –Analysis of linear search.

UNIT II

DIVIDE AND CONQUER: General Method, Merge sort, Quick sort, Binary search, Binary tree traversals and related properties.

UNIT III

DYNAMIC PROGRAMMING: General Method – Multistage Graphs – All-Pair shortest paths –Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem , Greedy Technique: General Method, Prim's algorithm, Kruskal's algorithm, Dijkstra's algorithm, single Source shortest paths.

UNIT IV

BACK TRACKING: General Method, 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles, Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem

UNIT V   '

Graph Traversals – Connected Components – Spanning Trees – Bi-connected components, NP-Hard and NP-Complete Problems: NP-Hard, NP-Complete classes, COOKS theorem.

TEXT BOOKS:

1. T. H. Corman, C Leiserson, Rivest, Ronald and stein Clifford. Introduction to algorithms. MGH, New York, 2001, 2nd Ed.
2. Anany Levitin. Introduction to the design and analysis of algorithms. Pearson education, 2003, 2nd Ed.
3. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007. (For Units II to V)

REFERENCE BOOKS:

1. E Horowitz, S Sahni, S Rajasekaran, Fundamentals of computer algorithms. Universities press, 2008, 2nd Ed.

2. Richard Neopolitan, Kumarss Naimipour. Foundations of algorithms using C++ pseudo code, Jones and Bartlett Learning, 1998, 2nd Ed.

3. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt. Ltd., 2000 (For Unit I)

Third Semester MCA

(4P2B36) OPERATING SYSTEMS

UNIT I

OPERATING SYSTEM INTRODUCTION: Operating System Definition, Evolution of Operating Systems- Simple, Batch, Multi Programmed, Time-Shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System Calls, Types of System Calls.

UNIT II

PROCESS AND CPU SCHEDULING: Process Concepts- The Process, Process State, Process Control Block, Threads, Process Scheduling- Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling Algorithms, PROCESS COORDINATION: Process Synchronization, the Critical-Section Problem, Peterson's Solution, Semaphores, Classic Problems of Synchronization.

UNIT III

DEADLOCKS: System model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

UNIT IV

MEMORYMANAGEMENT: Swapping, Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms, FILE SYSTEM INTERFACE: The Concept of a File, Access methods, Directory Structure, File System Structure, Allocation methods, MASS STORAGE STRUCTURE: Disk Attachment, Disk Scheduling algorithms.

UNIT V

PROTECTION: System Protection- Goals of Protection, Principles of Protection, Access Matrix, Implementation of Access Matrix, Security: - The Security Problem, Program Threats, System and Network Threats, User Authentication.

TEXT BOOKS:

1. Abraham Silberchatz, Peter B. Galvin. Operating System Principles. Wiley Student Edition, 2010, 8th Ed.
2. Andrew S Tanenbaum. Modern Operating Systems. Pearson/ PHI, 2011, 3rd Ed.

REFERENCE BOOKS:

1. R. Elmasri, A.G.Carrick and D.Levine. Operating Systems. MGH, 2010.
2. A.S. Godbole. Operating Systems. TMH, 2009, 2nd Ed.
3. W. Stallings. Operating Systems-Internal and Design Principles, Pearson Education, 2009, 6th Ed.

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Third Semester MCA

(4P2B37) DBMS LAB

List of Sample Problems/Experiments

1. Creation, altering and drop of tables and inserting, deleting and update the rows into a table using SELECT Command.
2. Queries using integrity constraints.
3. Queries using SQL operators like, relational, logical and set operators.
4. Queries using Aggregate and SQL functions.
5. Queries using join conditions.
6. Create Views, Sequences.
7. Write a Simple PL/SQL Program to display students' details.
8. Create PL/SQL block using IF/ELSE IF/NESTED IF statement.
9. Create PL/SQL block using WHILE/FOR Loops.
10. Create PL/SQL block using CASE Statement.
11. Create PL/SQL block using CURSORS.
12. Create PL/SQL block using EXCEPTION handling.
13. Create PL/SQL block using FUNCTION, PROCEDURE, TRIGGER and PACKAGE.

Third Semester MCA
(4P2B38) NETWORK PROGRAMMING LAB

List of Sample Problems/Experiments:

Experiment - 1:

A) The objective of this exercise is to give experience in using telnet to connect to the Linux host, login using the user id and password provided, and then to logout.

1. Fire up the telnet client specifying Lab system as the host.
2. When prompted provide your user id and password.
3. Logout or exit from the session.

B) The objectives of this exercise are to
* Familiarize yourself with a couple of commonly used commands, and,
* Let you explore the system a little.

1. Get help on the ls command, and then use the ls command to display the files and directories.
2. Find out who else is on the system.
3. What is your current directory (present working directory)?
4. Pipe the output of the ls –l / command to ls.output and see what you get.

C) The objectives of these exercises are to find out how you can see what a system is running and what resources the system is using.

1. Use the ps –ef | more command to locate what daemons are running on the system.
2. Use the top command to display the system activity.

Experiment - 2:

A) The objectives of these exercises are to:
 See how Linux can handle multiple file systems
 Examine the /proc file system which Linux uses to provide information about its internal operation

1. Find out what devices are mounted and what file systems are in use.
2. Examine a couple of the /proc files using the more command (hint, use the ls command to see what files exist within the /proc system).
The objective of this exercise is to familiarize you with the hierarchy of files within a file system.

3. Use the cd command to go to the "root" of the file system.
4. Use the cd command to go to your home directory.
5. Create a directory 'test' under your home directory.
6. Create a file 'real.file' within this directory.

7. Create a symbolic link in your home directory to 'real.file' called 'symbolic.link'.

B) The objective of this exercise is to work with files, directories and links.

Explore your file system:
 Identify 1st level directories
 Locate a symbolic link
 Use the umask command to display current default

Create 3 files ('all', 'group', 'owner') and assign permissions:
      All - r/w to owner, group, and others
       Group - r/w to owner and group, r/o to others
       Owner - r/w to owner, r/o to group, none to others

Experiment - 3:

Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.

Experiment - 4:

Write a shell script that deletes all lines containing a specific word in one or more files which are supplied as argument to it.

Experiment - 5:

A) Write a shell script to find factorial of the given integer.
B) Write a shell script to print prime numbers upto given limit.

Experiment - 6:

Write an awk script to find number of characters, words, and lines in a file.

Experiment-7:

Write a C program to implement the "cat" utility (file creation, display, file appending, etc.)

Experiment - 8:

Write a C program that accepts one or more file/directory names as command line input and reports the information such as file type, file permissions, access times, etc.,

Experiment - 9:

Write a C program to list for every file in a directory, its inode number, size and file name.

Experiment - 10:

Write a C program that permits a parent process to accept an integer from standard input and communicate to child process. The child process then computes the factors up to that integer and print.

Experiment - 11:

Write C programs that illustrate communication between two unrelated processes using a named pipe (FIFO).

Experiment - 12:

Write C programs that illustrate the communication between two unrelated processes using Message Queues/ Shared Memory.

Experiment – 13:

Write C programs that illustrate the communication between two processes using TCP/IP (or) UDP protocols with Socket.

REFERENCE BOOKS:

1. A practical guide to Linux commands, editors and shell programming: Mark G.sobell-2nd edition-Prentice hall, 2005.
2. W.Richard Stevens, Stephen A. Rago: Advanced Programming in the UNIX Environment, 2nd Edition, Pearson Education / Prentice-Hall of India, 2005.
3. Terrence Chan: UNIX System Programming Using C++, Prentice-Hall of India / Pearson Education, 1999.

Third Semester MCA

(4P2B39) JAVA PROGRAMMING LAB

1. Programs using constructor.

2. Creation of classes and use of different types of functions.

2. Count the number of objects created for a class using static member function.

3. Write programs on interfaces.

4. Write programs on packages.

5. Write programs using function overloading and overriding.

6. Programs using inheritance.

7. Programs using IO streams.

8. Programs using files.

9. Write a program using exception handling mechanism.

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Fourth Semester MCA

(4P2B41) SOFTWARE ENGINEERING

UNIT – I

Overview of System Analysis & Design, Business System Concept, System Development Life Cycle, Waterfall Model , Spiral Model, Feasibility Analysis, Technical Feasibility, Cost- Benefit Analysis, Professional and ethical responsibility, Socio-Technical systems: Emergent system properties; Systems engineering; Organizations, people and computer systems; Legacy systems.

UNIT – II

Software Processes: Models, Process iteration, Process activities; The Rational Unified Process
Software Requirements: Functional and Non-functional requirements; User requirements; System requirements; the software requirements document, Requirements Engineering Processes: Requirements elicitation and analysis; Requirements validation; Requirements management, Requirement modelling: Context models; Behavioral models; Data models; Object models; Structured Methods.

UNIT – III

Design concepts: The Design process, Design Concepts, Architectural Design: Architectural design decisions; System organization; Modular decomposition styles; Object-Oriented design: Objects and Object Classes; An Object-Oriented design process; Design Evolution.

UNIT – IV

VERIFICATION AND VALIDATION: Planning; Software inspections; automated static analysis; Verification and formal methods. Software testing: System testing; Component testing; Test case design; Test automation, Quality management: Quality concepts, Software Quality Assurance.

UNIT – V

SOFTWARE COST ESTIMATION: Productivity; Estimation techniques; Algorithmic cost modeling, Project duration and staffing.
Project Management: Management activities; Project planning; Project scheduling; Risk management

TEXT BOOKS:

1. Ian Sommerville. Software Engineering. Pearson Education Publications, 2007 (Chapters-: 1, 2, 3, 4, 5, 6, 7, 8, 11, 14, 17, 21, 22, 23, 26), 8th Ed.
2. Roger S. Pressman. Software Engineering - A Practitioners approach. McGraw-Hill, 2007, 7th Ed.

REFERENCE BOOKS:

1. Shari Lawrence P fleeger, Joanne M. Atlee. Software Engineering Theory and Practice. Pearson Education, 2006, 3rd Ed.
2. Waman S Jawadekar. Software Engineering Principles and Practice, Tata McGraw Hill, 2004.

Fourth Semester MCA

(4P2B42) SYSTEM SOFTWARE

UNIT-I

INTRODUCTION TO SYSTEMS PROGRAMMING: Evolution of the Components Of a programming System, Foundation of System Software Programming, machine Architecture – SIC, SIC/XE, machine language and Assembly language.

UNIT-II

INTRODUCTION TO ASSEMBLER: Introduction to assembler, Basic Functions Assembler, Features of Assembler, Assembler Design Options - one Pass and two Pass Assembler, Implementation Example.

UNIT-III

INTRODUCTION TO MACROS: Basic Macro Processor Functions Features of Macros, Design of Macro processor – one Pass and two Pass, Implementation Example

UNIT-IV

INTRODUCTION TO LOADERS: Basic Functions of a loader, Features of Loaders, Design of Loaders – Absolute and DLL, Implementation Example.

UNIT-V

INTRODUCTION TO COMPILERS: A brief discussion on various phases of compilers, Applications of FSM and grammars in compiler design.

TEXT BOOKS:

1. Donovan. Systems Programming, Tata McGraw Hill, 2001.

REFERENCE BOOKS:

1. Dhamdhere. System Programming. Tata McGraw Hill. Aug 1999, (2nd Revised Ed).
2. Leland, L.Beck. System Software. Pearson Education, Aug, 1996.

Fourth Semester MCA

(4P2B43) ADVANCED JAVA FOR WEB TECHNOLOGIES

UNIT I

HTML COMMON TAGS: Introduction, HTML Basics- Text, Colors, Links, Images, Lists, Forms, Frames, Tables, Web Page Design, HTML5, Cascading Style Sheets- Introduction to CSS, Types of CSS, CSS3
JAVA SCRIPT: Introduction to JavaScript, Basics of JavaScript, Control Structures, Pop Up Boxes, Functions, Arrays, Events, Objects and Simple Web Application. JQUERY, XML: Introduction, Document type definition, XML Schemas, Document Object Model, XML and Data Binding, Presenting XML(XSL), XML Processors: DOM and SAX.

UNIT II

WEB SERVERS AND SERVLETS:
Introduction to Servlets, Web Servers, Deployment of Servlets- How to write servlet, how to execute servlet, Lifecycle of a servlet, JSDK, The Servlet API, The javax, servlet package, Reading Servlet parameters, Reading Initialization parameters, The javax, servlet HTTP package, Handling HTTP Request and Responses, Cookies, Session Tracking.

UNIT III

INTRODUCTION TO JSP: The Problem with servlet, The anatomy of JSP page, JSP Processing, JSP application design with MVC, Setting up and JSP environment, Installing the Java Software Development Kit, Tomcat Server and Testing Tomcat, JSP Standard Tag Library(JSTL).

UNIT IV

JSP APPLICATION DEVELOPMENT: Generating Dynamic Content- Directive Elements, Template Text, Beans and JSP, Action Elements. Using scripting elements, Implicit JSP Objects, Conditional Processing- Declaring Variables and methods, Error handling and debugging

UNIT V

DATABASE ACCESS: Introduction, Database Programming with JDBC- How JDBC works, JDBC Architecture, JDBC Driver Types. Studying javax.sql.* package, Installation of MySQL, Accessing Database from JSP page- Use of Prepared Statement, Deploying Java Beans in a JSP Page.

TEXT BOOKS:

1. Patrick Naughton and Herbert Schildt. Complete Reference Java. 2002, 2nd Edition
2. Hans Bergstan. Java Server Pages. SPD publications, 2003, 3rd Ed.

REFERENCE BOOKS:

1. Knuckles. Web Applications Technologies Concepts. John Wiley, 2006, 1st Ed.
2. Wang. An Introduction to Web Design and Programming. Thomson, 2007, 1st Ed.
3. Pekowsky. Java Server Pages. Pearson, 2008.
4. D.Flanagan, Java Script, O'Reilly, SPD.
5. Michael Morrison, XML Unleashed, Tech Media
6. O'neil, Java Beans Programming, TMH, 2005.

Fourth Semester MCA
(4P2B44) DATA WAREHOUSING AND MINING

UNIT I

Introduction to Data Warehousing -Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining, Introduction to Data Mining: What is Data mining?, Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining, A Multidimensional Data model.

UNIT II

 Data Preprocessing, Language, Architectures, Concept Description- Why Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

UNIT III

Association Rules - Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases.

UNIT IV

Classification And Clustering- Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods, Prediction, Classifier Accuracy, Cluster Analysis, Types of data, Categorization of methods, Partitioning methods, Outlier Analysis.

UNIT V

Recent Trends - Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, World Wide Web, Applications and Trends in Data Mining

TEST BOOKS:

1. Jiawei Han and Micheline Kamber. Data Mining-concepts and Techniques. Morgan Kallfman March 2006, 2nd Ed.

REFERENCE BOOKS:

1. Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson
    Education 2004

2. Sam Anahory, Dennis Murry, "Data Warehousing in the real world", Pearson Education
 2003.

3. David Hand, Heikki Manila, Padhraic Symth, "Principles of Data Mining", PHI 2004.

Fourth Semester MCA

(4P2B4A) CLOUD COMPUTING
(Elective I)

UNIT I

Cloud Computing Introduction, History of Cloud Computing, uses, services, types of cloud computing. Applications of Cloud Computing, feature perspective and developments of cloud computing.

UNIT II

Working of cloud computing and Collaboration of Cloud computing, Centralizing email communication, cloud computing for community, collaboration on schedules, collaborating on group projects and events, cloud computing for corporation and mapping scheduling & managing projects.

UNIT III

Collaborating on calendars, schedulers and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets and databases

UNIT IV

Evaluating web mail services, evaluating instant messaging, evaluating web conference tools, Creating groups on social networks, evaluating on line groupware, collaborating via blogs and wikis.

UNIT V

Understanding cloud Storage, evaluating on line file storage, exploring on line book marking services, exploring on line photo editing applications, exploring photo sharing communities, controlling it with web bases desktops.

TEXT BOOK:

1. Michael Miller. Cloud computing. Pearson Education, New Delhi, 2009.

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Fourth Semester MCA
(4P2B4B) COMPUTER GRAPHICS AND MULTIMEDIA
(Elective – I)

UNIT I

Introduction and Output Primitives -Introduction – Applications - Overview of Graphics System – Introduction to OpenGL – Output Primitives – Line, Circle and Ellipse Generating Algorithms – Interactive Input Methods.

UNIT II

2D - Graphics- Two Dimensional Transformations -Basic Transformations, Reflection – Shear- 2D Viewing Pipeline – Window to Viewport Mapping - Clipping – Polygons - Splines - Bezier Curves.

UNIT III

3D - Graphics - 3D Transformations - Viewing a 3D scene - Visible Surface Detection Methods – Visualization and polygon rendering – Color Models – Computer Animation – General Animation Functions - Key Frame systems - Morphing.

UNIT IV

Overview of Multimedia - Definition - Multimedia Elements Overview - Multimedia Hardware and software – Compression and Decompression - Components of multimedia – Text, Image – Graphics – Audio – Video – Animation – Authoring.

UNIT V

Multimedia Systems and Applications
Multimedia Communication systems – Synchronization Issues – Presentation requirements – Applications – Video conferencing – Virtual reality – Interactive video – Video on Demand –Introduction to VRML.

TEXT BOOKS

1. Donald Hearn and M. Pauline Baker, "Computer Graphics with OpenGL",Third Edition, 2004,Prentice Hall.
2. Ranjan Parekh, "Principles of Multimedia", 1st Edition, 2006, Tata McGraw-Hill Education.

REFERENCE BOOKS

1. Hearn D and Baker M.P, "Computer graphics – C Version", 2004, 2nd Edition, Pearson Education
2. Angel Edward," Interactive Computer Graphics - A Top-down Approach With Opengl", 2000, 2nd Edition
3. Andries van Dam, F. Hughes John, James D. Foley, Steven K. Feiner, "Computer Graphics: Principles and Practice in C", 2nd Edition, 2002, Pearson Education.

4. Ralf Steinmetz, Klara steinmetz, "Multimedia Computing, Communications and Applications", 2004, Pearson education

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Fourth Semester MCA
(4P2B4C) SOFTWARE PROJECT MANAGEMENT
(Elective I)

UNIT I

FUNDAMENTALS: Conventional software management - Evolution of software economics - Improving software economics - Conventional versus modern software project management.

UNIT II

SOFTWARE MANAGEMENT PROCESS FRAMEWORK: Lifecycle phases - Artifacts of the process - Model based software architectures - Workflows of the process - Checkpoints of the process.

UNIT III

SOFTWARE MANAGEMENT DISCIPLINES: Iterative process plans - Organization and responsibilities - Process automation - Process control and process instrumentation - Tailoring the process.

UNIT IV

MANAGED AND OPTIMIZED PROCESS: Data gathering and analysis - Principles of data gathering - Data gathering process - Software measures - Data analysis - Managing software quality - Defect prevention.

UNIT V

CASE STUDIES:COCOMO cost estimation model - Change metrics - CCPDS-R.

TEXT BOOKS

1. Walker Royce, "Software Project Management - A Unified Framework", Pearson Education, 2004.

2. Humphrey Watts, "Managing the Software Process", Addison Wesley, 1989.

REFERENCES

1. Humphrey Watts, "Managing the Software Process", Addison Wesley, 1989.

2. Ramesh Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.

3. Bob Hughes and Mikecotterell, "Software Project Management", 3rd Edition,

 Tata McGraw Hill, 2004.

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Fourth Semester MCA
(4P2B4D) DISTRIBUTED DATABASES
(Elective II)

UNIT I

DISTRIBUTED DATABASES: An Overview Features of Distributed versus Centralized Databases, Why Distributed Databases? Distributed Database Management Systems (DDBMSs), Architecture for Distributed Databases, Types of Data Fragmentation, Distributed Database Access Primitives.

UNIT II

LEVELS OF DISTRIBUTION TRANSPARENCY: Distribution Transparency for Read-Only Applications, Distribution Transparency for Update Applications, and Integrity Constraints in Distributed Databases, Distributed Database Design: A Framework for Distributed Database Design, the Design of Database Fragmentation, and The Allocation of Fragments.

UNIT III

OPTIMIZATION OF ACCESS STRATEGIES: A Framework for Query Optimization, Join Queries, General Queries, The Management of Distributed Transaction: A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions.

UNIT IV

CONCURRENCY CONTROL: Foundations of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control Based on Timestamps. Reliability: Basic Concepts, Non-blocking Commit Protocols, Checkpoints and Cold Restart.

UNIT V

DISTRIBUTED DATABASE ADMINISTRATION: Catalog Management in Distributed Databases, Authorization and Protection, Commercial Systems: IBM's Inter System Communication.

TEXT BOOK:

1. Stefano ceri, Giuseppe Pelagatti. Distributed Databases Principles and System. MGH, Aug 2008.

REFERENCE BOOK:

1. M.tamer ozsu, Patrick valduriez. Principles of Distributed database systems. July 2007, 3rd Edition.

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Fourth Semester MCA

(4P2B4E) ARTIFICIAL INTELLIGENCE

UNIT-I

Introduction: What is AI? , History, Overview, Intelligent Agents, Performance Measure, Rationality, Structure of Agents, Problem-solving agents, Problem Formulation, Uninformed Search Strategies.

UNIT-II

Informed (Heuristic) Search and Exploration, Greedy best first search, A* search, Memory bounded heuristic search, Heuristic functions, inventing admissible heuristic functions, Local Search algorithms, Hill-climbing, Simulated Annealing, Genetic Algorithms, Online search.

UNIT-III

Constraint Satisfaction Problems, Backtracking Search, variable and value ordering, constraint propagation, intelligent backtracking, local search for CSPs, Adversarial Search, Games, The minimax algorithm, Alpha-Beta pruning, Imperfect Real-Time Decisions, Games that include an Element of Chance

UNIT-IV

Knowledge Based Agents, Logic, Propositional Logic, Inference, Equivalence, Validity and satisfiability, Resolution, Forward and Backward Chaining, DPLL algorithm, Local search algorithms, First Order Logic, Syntax and Semantics of FOL, Inference in FOL, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT-V

Planning, Language of planning problems, planning with state space search, partial order planning, planning graphs, planning with propositional logic, Uncertainty, Handing uncertain knowledge, rational decisions, basics of probability, axioms of probability, inference using full joint distributions, independence

Text Books:

1. Artificial Intelligence: A Modern Approach: Stuart Russel and Peter Norving, Prentice Hall Series in AI.
2. Artificial Intelligence:Winston P.H., Addison Wesley,.
3. Artificial Intelligence:E.Rich and Knight, Tata McGraw Hill.

Fourth Semester MCA

(4P2B4F) MANAGEMENT INFORMATION SYSTEMS

(Elective II)

UNIT I

INTRODUCTION: MIS Definition, Role of MIS, and Impact of the MIS, Management as a Control System, Organization as a System, and MIS for a Digital Firm.
Decision Making: Decision-Making Concepts, Decision-Making Process, Behavioral Concepts in Decision-Making, Organizational Decision-Making.

UNIT II

INFORMATION SYSTEMS IN GLOBAL BUSINESS TODAY: The role of Information System in Business Today, Perspective of Information Systems, Organizations and Strategy: Organizations and Information Systems, How Information Systems Impact Organizations and Business Firms, Using Information Systems to Achieve Competitive Advantage, Porter's Competitive Forces Model.

UNIT III

INFORMATION, KNOWLEDGE, BUSINESS INTELLIGENCE: Information Concept, Classification of Information, Methods of Data and Information Collection, Knowledge Management Systems. Database and Information Management: Organizing Data in Traditional File Environment, The Database Approaches to Data Management, Using Databases to improve Business and Decision Making.
CONCEPTUAL SYSTEM DESIGN: Define the Problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternative conceptual designs and select one, document the system concept, prepare the conceptual design report.

UNIT IV

PITFALLS IN MIS DEVELOPMENT: Fundamental weaknesses, soft spots in planning, design problems, Introduction to E-Commerce and E-Commerce challenges, Security and ethical issues of information system.

UNIT V

ENHANCING DECISION MAKING: Systems for Decision Support, Executive Support Systems, Growth of International Information Systems, Organizing International Information Systems, Managing Global Systems, Technology Issues and Opportunities for Global Value Chains.

TEXT BOOKS:

1. R.G. Murdick, J.E Ross and J.R clagget. Information Systems for Modern Management. PHI, 1994,3rd Ed,.
2. Kenneth C. Laudon, Jane P. Laudon. Management Information Systems, Managing the Digital Firm, Pearson Education, 2010, 11th Ed.

REFERENCES:

1. Waman S Jawadekar. Management Information Systems Text and Cases, MGH, Jun 2009.
2. Robert schultberis, Mary sumner. Management information systems. PHI,1999
3. C.S.V Murthy. Management information systems text and applications,.HPH, 2011, 3rd Edreprint.

Fourth Semester MCA

(4P2B47) SOFTWARE ENGINEERING LAB

1. Case Study 1: Library Case Study
2. Case Study 2: Retail Domain
3. Case Study 3: Bank Domain
4. Case Study 4: Insurance Domain
5. Case Study 5: Any Internet Application

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Fourth Semester MCA
(4P2B48) WEB TECHNOLOGIES LAB

1. Develop static pages of an online Bookstore. The pages should resemble www.amazon.com. The website should consist the following pages
   - Home Page
   - Registration Page
   - Login Page
   - Books Catalogue
   - Shopping Cart
   - Payment By Credit Card
   - Order Confirmation

2. Design a web page using Cascading Style Sheet

3. Validate the Registration, user login, user profile, and payment by credit card pages using JavaScript

4. Create and save an XML document at the server, which contains 10 users information. Write a program which takes User ID as input and returns the user details by taking the user information from the XML document

5. Write XML file which will display the Book information which includes 1) Title of the Book 2)Author Name 3)ISBN Number 4) Publisher Name 5) Edition 6) Price

6. Write a simple Document Object Model program to create XML document.
7. Write a simple XSLT Program to display XML data in HTML document
8. Write a simple bean program for generating the traffic signal

9. Install Tomcat Web Server on port 8080. Convert the above created static web pages into dynamic web pages using servlets.
10. Assume four users user1, user2, user3 and user4 having passwords- pwd1, pwd2, pwd3 and pwd4 respectively. Write a Servlet for doing the following:

   a) Create a cookie and add these four user ids and passwords to the cookie
   b) Read the user id and password entered in the Login form and authenticate with the value available in the cookies. If he is a valid user you should welcome him/her by the name else you should display "You are not an authorized User". Use init-parameters to do this.

11. Install database MySql. Create a table which should contain at least the following fields such as name, password, email-id, phone number. Write a JSP program to connect to database and extract data from tables and display them. Insert the details of the users who register with web site whenever new user clicks the submit button in the registration page.

12. Develop a JSP page for news channel to conduct opinion poll on any topic. Users will respond through yes/no answers. Later display the results in percentages.

13. Create tables in database which contain the details of book such as book name, price, quantity, and amount, Modify the catalogue page in such a way that you should connect to database and extract data from tables and display them in catalogue page using JDBC.

Fourth Semester MCA

(4P2B49) DATA WAREHOUSING AND MINING LAB

The objective of the lab exercises is to use data mining techniques to identify customer segments and understand their buying behavior and to use standard databases available to understand DM processes using WEKA (or any other DM tool)

1. Perform credit risk assessment Task using WEKA Tool.
2. Build Multidimensional data models for Hospital Management System.
3. Implement the following Multidimensional Data Models

    i. Star Schema
    ii. Snowflake Schema
    iii. Fact Constellation

4. Implement Apriori algorithm to generate frequent Item Sets

5. Implement the following clustering algorithms

    i. K-means
    ii. K-mediods

6. Implement the following classification algorithms
    i. Decision Tree Induction
    ii. KNN
7. Perform data Preprocessing using WEKA
8. Perform Discretization of data using WEKA
9. Classification algorithms using WEKA
10. Apriori algorithm using WEKA
11. Perform data transformations using an ETL Tool
12. A small case study involving all stages of KDD. (Datasets are available online like UCI Repository etc.)

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Fifth Semester MCA

(4P2B51) RESEARCH METHODOLOGY

UNIT I

INTRODUCTION TO RESEARCH
The hallmarks of scientific research – Building blocks of science in research – Concept of Applied and Basic research – Quantitative and Qualitative Research Techniques – Need for theoretical frame work – Hypothesis development – Hypothesis testing with quantitative data. Research design – Purpose of the study: Exploratory, Descriptive, Hypothesis Testing.

UNIT II

EXPERIMENTAL DESIGN - Laboratory and the Field Experiment – Internal and External Validity – Factors affecting internal validity, Measurement of variables – Scales and measurements of variables, Developing scales – Rating scale and attitudinal scales – Validity testing of scales –Reliability concept in scales being developed – Stability Measures.

UNIT III

METHODS OF DATA COLLECTION: Interviewing, Questionnaires, etc. Secondary sources of data collection, Guidelines for Questionnaire Design – Electronic Questionnaire Design and Surveys, Special Data Sources: Focus Groups, Static and Dynamic panels. Review of Advantages and Disadvantages of various Data-Collection Methods and their utility. Sampling Techniques – Probabilistic and non-probabilistic samples, Issues of Precision and Confidence in determining Sample Size

UNIT IV

MULTIVARIATE STATISTICAL TECHNIQUES
Data Analysis – Factor Analysis – Cluster Analysis – Discriminant Analysis – Multiple Regression and Correlation – Canonical Correlation – Application of Statistical Software Package in Research

UNIT V

RESEARCH REPORT - Structure and Components of Research Report, Types of Report, Layout of Research Report, Mechanism of writing a research report, referencing in academic writing, – Recommendations and Implementation section – Conclusions and Scope for future work

CASE STUDY - Presentation by students on their area of research.

TEXT BOOKS:

1. Kothari, C.R., "Research Methodology: Methods and Techniques", 2nd Edition, New Age International, New Delhi, 2012.

2. Nicholas Walliman, "Your Research Project", 2nd Edition, Vistaar Publication, New Delhi, 2005.

3. Donald R. Cooper and Pamela S. Schindler, Business Research methods, 9th Edition, Tata Mc Graw Hill, 2006.

REFERENCES:

1. Taha H.A., "Operations Research: An Introduction", 7th Edition, Pearson Education Edition, Asia, New Delhi, 2002.

2. Richard A. Johnson, "Miller and Freund's Probability and Statistics for Engineers", 8th Edition, Pearson Education, Asia, 2011.

3. Alan Bryman and Emma Bell, Business Research methods, Oxford University Press, New Delhi, 2008.

Fifth Semester MCA

(4P2B52) .NET TECHNOLOGIES

UNIT I

INRODUCTION TO .NET FRAMEWORK: .NET Overview- Behind Microsoft .NET- The .NET Platform-.NET Framework Design Goals- .NET Framework- Common Language Runtime –CLR Environments and Executables-Metadata-JIT Compilation-Automatic Memory Management-Assemblies and Manifests- Intermediate Language(IL)- CTS and CLS- CLR Execution.

UNIT II

INTRODUCTION TO C# .NET PROGRAMMING: A Demonstration of Visual C#- Common Elements in Visual C- C# Core Language Features- Types- Classes- Structures- Enumeration- Inheritance- Interfaces- Polymorphism- Arrays and Collections- Generics- Operator Overloading- Delegates and Events- Introduction to LINQ Programming- Exception Handling- MSIL Programming.

UNIT III

APPLICATION DEVELOPMENT USING ADO .NET: Features of ADO .NET- Architecture of ADO .NET- ADO .NET Providers- Accessing Database 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.

UNIT IV

INTRODUCTION TO ASP.NET: Introduction- Working in ASP.NET Controls- Session and Cookies- Caching- Authentication and Authorization-Web User Controls- Working with Web Config file- Implementing Security- Crystal Reports-Creating Setup and Deployment.

UNIT V

WEB SERVICES: Introduction to Web Services- Web Services Protocol and Standards- WSDL-Overview of UDDI- Calling a Web Service from a Browser- Calling a Web Service by using a proxy- Creating a Simple Web Service-AJAX

TEXT BOOKS:

1. Thuan L. Thai. .NET Framework Essentials. O'Reilly, 2003, 3rd Ed.
2. Donis Marshall. Programming Microsoft Visual C# 2008. Microsoft Press 2008.
3. Francesco Balena. Programming Microsoft Visual Basic .NET. Microsoft Press 2006.

REFERENCE BOOKS:

1. Rebecca M. Riordan. Microsoft ADO.NET Step by Step. Microsoft Press 2002.
2. Kogent, ASP.NET 3.5 Black Book, Dream Tech Publications, 2010.
3. Andy Wigley, Peter Roxburgh. Building Microsoft ASP.NET Applications for Mobile Devices. Microsoft Press 2003, 2nd Ed.

Fifth Semester MCA

(4P2B53) Object Oriented Modeling and Design with UML

UNIT I

INTRODUCTION: Object Orientation, importance of modeling, principles of modeling, UML architecture and Conceptual model of UML.

UNIT II

Structural Modeling: Classes, Relationships, Common Mechanisms, Advanced classes, advanced relationships, Interfaces, Packages, modeling Class and Object Diagrams

UNIT   III

BEHAVIORAL MODELING: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Collaborations and Activity Diagrams.

UNIT   IV

ADVANCED BEHAVIORAL MODELING: Events and signals, state machines, processes and Threads, time and space, state chart diagrams

UNIT V

ARCHITECTURAL MODELING: Component, Deployment, Component diagrams and Deployment diagrams.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson. The Unified Modeling Language User Guide. Pearson Education.1998.
2. Michael Blaha and James Rumbaugh. Object Oriented Modeling and Design with UML, 2005.

REFERENCE BOOKS:

1. Craig Larman. Appling UML and Patterns: An introduction to Object - Oriented Analysis and Design and Unified Process. Pearson Education, 2008.
2. Bernd Oestereich. Developing software with UML- Addision-Wesley, June 2002.
3. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado. UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.2004.

Fifth Semester MCA

(4P2B54) OPEN SOURCE SOFTWARE

UNIT - I

Open Source Software: Definitions & History- Definitions of terms, A Brief History of Software Where Open Source Is Successful –Analytical Framework, Open Source in widespread successful use, Examples of Open Source Systems; Open Source: The Good, the Bad, and the Ugly-What is Good about Open source, Open Source is Not enough by itself, How Choosing Open Source Is More difficult for You, What Others Say about Open Source.

UNIT – II

Five Open Source Opportunities – Introduction, Directory Services, Email, Groupware and Collaboration, Complex Web Publishing, Manage User Desktops, Other Possibilities Operating Systems – Contents of the Operating systems, Linux Distribution Vendors, Enterprise Distribution Vendors, Community-Supported Distribution Vendors, International Alternatives

UNIT - III

Open Source Server Applications – Infrastructure Services, Web Services, Database Servers, Mail Servers, System Management Open Source Desktop Applications – Introduction, Graphical Desktops, Web Browsers, The Office Suite, Mail and Calendar Clients, Personal Software

UNIT - IV

How Open Source Software is Developed – Methodology, Languages Used to Develop Open source Products, Cross-Platform Code Application Architecture – Types of Systems, Tiered Design, Managing Performance and Scalability, Interoperability, Development Platform Choices

UNIT - V

Managing System Implementations – Implementation Roles, Open Source Impact on Team Issues, Implementation Process, Implementations Principles, Key Documents, Migration, Interacting with Open Source Community, Support; The Cost of Open Source Systems- Total Cost of Ownership, Types of Costs, Scenarios Licensing – Types of Licenses, Licenses in Use, Mixing Open and Closed Code, Dual Licensing, Other Intellectual Property Issues

TEXTBOOK

1. Open Source Software Implementation and Management, Paul Kavanagh, Elsevier Digital Press.
2. Understanding Open Source Software Development, Joseph Feller and Brian Fitzgerald, Addison Wesley Professional 2002.
3. Producing Open Source Software, Karl Fogel, O'reilly-2006.

Fifth Semester MCA

(4P2B5A) BIG DATA

(Elective III)

UNIT I

INTRODUCTION TO BIG DATA : Big Data and its Importance – Four V's of Big Data – Drivers for Big Data –Introduction to Big Data Analytics – Big Data Analytics applications.

UNIT II

BIG DATA TECHNOLOGIES : Hadoop's Parallel World – Data discovery – Open source technology for Big Data Analytics – cloud and Big Data –Predictive Analytics – Mobile Business Intelligence and Big Data – Crowd Sourcing Analytics – Inter- and Trans-Firewall Analytics - Information Management

UNIT III

PROCESSING BIG DATA: Integrating disparate data stores - Mapping data to the programming framework Connecting and extracting data from storage - Transforming data for Processing - Subdividing data in preparation for Hadoop Map Reduce.

UNIT IV

HADOOP MAPREDUCE: Employing Hadoop Map Reduce - Creating the components of Hadoop Map Reduce jobs - Distributing data processing across server farms –Executing Hadoop Map Reduce jobs - Monitoring the progress of job flows - The Building Blocks of Hadoop Map Reduce - Distinguishing Hadoop daemons - Investigating the Hadoop Distributed File System Selecting appropriate execution modes: local, pseudo-distributed, fully distributed.

UNIT V

ADVANCED ANALYTICS PLATFORM: Real-Time Architecture – Orchestration and Synthesis Using Analytics Engines– Discovery using Data at Rest – Implementation of Big Data Analytics – Big Data Convergence – Analytics Business Maturity Model

TEXT BOOKS:

1. Michael Minelli, Michehe Chambers, "Big Data, Big Analytics: EmergingBusiness Intelligence and Analytic Trends for Today's Business", 1st Edition,Ambiga Dhiraj, Wiely CIO Series, 2013.

2. Arvind Sathi, "Big Data Analytics: Disruptive Technologies for Changing theGame", 1st Edition, IBM Corporation, 2012.

REFERENCES:

1. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", 1st Edition, Wiley and SAS Business Series, 2012.

2. Tom White, "Hadoop: The Definitive Guide", 3rd Edition, O'reilly, 2012.

Fifth Semester MCA

(4P2B5B) SOFT COMPUTING
(Elective III)

UNIT I

INTRODUCTION TO SOFT COMPUTING: Evolution of Computing – Soft Computing Constituents – From Conventional AI to Computational Intelligence – Machine Learning Basics.

UNIT II

GENETIC ALGORITHMS : Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem),Differences & similarities between GA & other traditional methods, Applications of GA.

UNIT III

NEURAL NETWORKS : Machine Learning using Neural Network, Adaptive Networks – Feed Forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks – Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance Architectures – Advances in Neural Networks.

UNIT IV

FUZZY LOGIC: Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions – Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making

UNIT V

NEURO – FUZZY MODELING : Adaptive Neuro – Fuzzy Inference Systems – Coactive Neuro – Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule base Structure Identification – Neuro – Fuzzy Control – Case Studies

TEXT BOOKS:

1. Jyh – Shing Roger Jang, Chuen – Tsai Sun, Eiji Mizutani, "Neuro – Fuzzy and Soft Computing", Prentice – Hall of India, 2003

2. Kwang H.Lee, "First course on Fuzzy Theory and Applications", Springer – Verlag Berlin Heidelberg, 2005.

3. S.Rajasekaran and G.A.V.Pai. Neural Networks, Fuzzy Logic and Genetic Algorithms. PHI.2003.

REFERENCE BOOKS:

1. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic – Theory and Applications", Prentice Hall, 1995.

2. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

3. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 2007.

4. Mitsuo Gen and Runwei Cheng, "Genetic Algorithms and Engineering Optimization", Wiley Publishers 2000.

Fifth Semester MCA
(4P2B5C) SOFTWARE ARCHITECTURE
(Elective III)

UNIT I

INTRODUCTION TO SOFTWARE ARCHITECTURE: An Engineering Discipline for Software, Status of Software Architecture, Architecture Business Cycle, Importance of Architectures, Software Processes and the Architecture Business Cycle, Features of Good Architecture.

UNIT II

ARCHITECTURE STYLES: Pipes and Filters, Data Abstraction and Object Oriented organization, Even-based Implicit Invocation, Layered Systems, Repositories, Interpreters, Process Control, Heterogeneous Architectures.
Formal models and Specifications: Formalizing the Architectural of a Specific System, Architectural Style, and Architectural Design Space.

UNIT III

SHARED INFORMATION SYSTEMS: Database Integration, Interpretation in Software Development Environments, Architectural Structures for Shared Information Systems

UNIT IV

ARCHITECTURAL PATTERNS: Structured Patterns, Patterns for Distribution, and Patterns for Interactive Systems.

UNIT V

ARCHITECTURAL DESCRIPTION LANGUAGES: Capturing Architectural Information in an ADL, Application of ADL's in system Development, Example of ADL.

TEXT BOOKS:

1. Mary Shaw, David Garlan. "S/W Arch. Perspective: on an Emerging Discipline". PHI, 1996.
2. Len Bass, Paul Elements, Rick Kazman. Software Architecture in Practice. PEA, 1998.

REFERENCE BOOKS:

1. Buschmann. Pattern Oriented Software Architecture. Wiley, 1996.

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Fifth Semester MCA
(4P2B5D) SOFTWARE TESTING METHODOLOGIES
(Elective – IV)

UNIT I

INTRODUCTION: Purpose of testing, Dichotomies, Model for testing, Consequences of bugs, Taxonomy of bugs.

UNIT II

FLOW GRAPHS AND PATH TESTING: Basic Concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing, TRANSACTION FLOW TESTING: Transaction flows, transaction flow testing techniques. Data Flow Testing: Basics of Dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT III

DOMAIN TESTING: domains and paths, Nice and Ugly domains, domain testing, domains and interface testing, domains and testability.

UNIT IV

PATH,PATH PRODUCTS AND REGULAR EXPRESSIONS: path products and path expressions, Reduction procedure and Applications, LOGIC BASED TESTING: Overview, decision tables, path expressions.

UNIT V

STATE, STATE GRAPHS AND TRANSITION TESTING: State graphs, good and bad state graphs, state testing - GRAPH MATRICES AND APPLICATION: Matrix of graph, relations, powers of a matrix, node reduction algorithm, Building tools.

TEXT BOOKS:

1. Boris Beizer. Software testing techniques. Dreamtech, 2009, 2nd Ed.

REFERENCE BOOKS:

1. Edward kit. Software testing in the real world. Addison-Wesley professional, July 1995.

2. Dr.K.V.K.K.Prasad. Software Testing Tools. Dreamtech press, New Delhi, 2007, Reviewed

Fifth Semester MCA

(4P2B5E) INFORMATION SECURITY
(Elective – IV)

UNIT I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs

UNIT II

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC

UNIT III

Public key cryptography principles, public key cryptography algorithms, digital signatures, Kerberos, X.509 Directory Authentication Service, EMAIL PRIVACY: Pretty Good Privacy (PGP) and S/MIME.

UNIT IV

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.
Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

UNIT V

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats, Firewall Design principles, Trusted Systems, Intrusion Detection Systems

TEXT BOOKS:

1. William Stallings. Network Security Essentials (Applications and Standards). Pearson Education.
2. Bruce Schneier. Applied Cryptography. Toha Wiley and Sons, 1996, 2nd Ed.
3. Stallings. Cryptography and Network Security - Principles and Practice. Prentice Hall, 2002, 3rd Ed.

REFERENCE BOOKS:

1. Eric Maiwald. Fundamentals of Network Security. Dreamtech press, 2003.

2. Charlie Kaufman, Radia Perlman and Mike Speciner. Network Security - Private Communication in a Public World. Pearson/PHI, 2002.
3. Whitman. Principles of Information Security. Thomson, 2008, 3rd Ed.

Fifth Semester MCA

(4P2B5F) MOBILE APPLICATION DEVELOPMENT
(Elective IV)

UNIT I

Introduction: Mobile operating system, Operating system structure, Constraints and Restrictions, Hardware configuration with mobile operating system, Features: Multitasking Scheduling, Memory Allocation, File System Interface, Keypad Interface, I/O Interface, Protection and Security, Multimedia features.

Unit II

Introduction to Mobile development IDE's, Introduction to Work light basics, Optimization, pages and fragments , Writing a basic program- in Work light Studio, Client technologies, Client side debugging, Creating adapters, Invoking adapters from Work light Client application, Common Controls, Using Java in adapters, Programming exercise with Skins, Understanding Apache Cordova, Offline access, Encrypted cache deprecated, Using JSON Store

Unit III

Understanding Apple iOS development, Android development, Shell Development, Creating Java ME application, Exploring the Work light Server, Working with UI frameworks, Authentication, Push notification, SMS Notifications, Globalization, Web View overlay, Creating Authentication application: development for Apple iOS by using a login module, Device Analytics, Work light Server Administration

Unit IV

Windows Phone: Introduction to Windows Phone, Architecture, memory management, communication protocols, application development methods, deployment, WorkLight, Kendo, Appcon, Xcode, Xpages ; Android: Introduction to Android, Architecture, memory management, communication protocols, application development methods, deployment.

Case Study: Design and development of Application using mobile application development platforms e.g. Worklight, Kendo, Appcon, Xcode, Xpages

UNIT V

IOS: Introduction to IOS, Architecture, memory management, communication protocols, application development methods, deployment.
Case Study: Design and development of Application using mobile application development platforms e.g. Work Light, Kendo, Appcon, Xcode, Xpages

Text Books:

    1. Anubhav Pradhan, Anil V Deshpande, "Mobile Apps Development" Edition: I

    2. Jeff McWherter, Scott Gowell "Professional Mobile Application Development", John Wiley & Sons, 2012.
    3. Barry Burd, "Android Application Development All in one for Dummies", Edition: I
    4. Teach Yourself Android Application Development In 24 Hours, Edition: I, Publication: SAMS

References:

1. Neal Goldstein, Tony Bove, "iPhone Application Development All-In-One For Dummies", John Wiley &Sons
2. Henry Lee, Eugene Chuvyrov, "Beginning Windows Phone App Development", Apress, 2012.
3. Jochen Schiller,"Mobile Communications", Addison-Wesley, 2nd edition, 2004.
4. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
5. Work light resources

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Fifth Semester MCA

(4P2B57) .NET TECHNOLOGIES LAB

1. Write a simple program in c# to write a string on the screen

2. Write a program in C# to prompt the user for some input and then take some action

3. Write a program in C# to demonstrate different kinds of arrays including jagged arrays.

4. Write a program to demonstrate boxing

5. Write a program in C# to override a method which calculates pay of employees to take bonus into account.

6. Write a Program to implement an Interface

7. Write a program in C# to create a base class shape and derived classes i.e., Rectangle, Circle, and Triangle. Invoke the method from base class shape using polymorphism

8. Write a VB.Net program to accept a string and convert the case of the characters.

9. Develop a menu based VB.Net application to implement a text editor with cut, copy, paste, save and close operations.

10. Develop a VB.Net application to perform timer based quiz of 10 questions.

11. Develop a database application to store the details of students using ADO.NET.

12. Create a simple ASP.NET page to Output Text with a form, two HTML text boxes an HTML button, and an HTML <span> element. Create an event procedure for the button.

13. Create a application for Accessing a SQL Database by Using ADO.NET by connecting to the SQL Server database and call a stored procedure. You then display the data in a Repeater control.

14. Write a program that displays a button in green color and it should change into yellow when the mouse moves over it.

15. Write a program containing the following controls:
• A ListBox
• A Button
• An Image
• A Label

The listbox is used to list items available in a store. When the user clicks on an item in the listbox, its image is displayed in the image control. When the user clicks the button, the cost of the selected item is displayed in the control.

16. Create a Form that receives the user name, address, date, nationality, country preferred for working and skill sets from the user and stores the user name in the client using cookies. The country preferred data should appear in a drop down list whereas, others should be entered in a textbox. Validate all the controls. The Form is named "formexp.aspx". The date should appear between "1/1/1900" and "1/1/2090".

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Fifth Semester MCA

(4P2B58) UML LAB

Select 5 Projects from the following and design UML Diagrams

1. Online Library System

2. Airlines Reservation System

3. ATM Model

4. Online Gas Booking System

5. Personal Computer Model

6. Point Of Sale

7. Simulated Company

8. Student Model

REFERENCES:

1. Bernd Oestereich. Developing software with UML. Addision-Wesley, June 2002.

2. Mark Priestley. Practical Object-Oriented Design with UML. Tata Mc-Graw Hill, 2005.

3. Craig Larman. Appling UML and Patterns: An introduction to Object - Oriented Analysis and Design and Unified Process. Pearson Education, 2008.

4. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado. UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.2004.

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Fifth Semester MCA

(4P2B59) SOFTWARE DEVELOPMENT LAB

Develop Software using CASE tools for the applications like:

1. Online Railway Reservation System
2. Payroll processing application
3. Inventory system
4. Automating the banking process
5. Software for game
6. Library management system
7. Create a dictionary
8. Text editor
9. Telephone directory
10. Create an E-Book of your choice

Software Required:

1. Languages: C/C++/Java/JSDK/Web browser.
2. Any Front end tool: (like VB, VC++, Developer 2000) etc
3. Any Backend tool: (Oracle, Ms-Access, SQL) etc.
4. Any CASE tool