

**UNIVERSITY DEPARTMENT OF COMPUTER APPLICATIONS (MCA)
VINOBA BHAVE UNIVERSITY, HAZARIBAG**

COURSE STRUCTURE

CHOICE BASED CREDIT SYSTEM (CBCS)

The proposed CBCS system has the potential of providing a choice of a wide spectrum of subjects/branches of subjects to students in pursuit of achieving their cherished goals. This system has been globally accepted and now has become the need of the day. The UGC also has provided guidelines to the Universities for consideration and implementation of CBCS.

The University Department of Computer Applications proposes the following courses and credits to be initiated at MCA w.e.f. the session 2015-18. The proposed system may be modified/improved in future according to the requirements.

CORE Papers

Semester – I

Paper Code	Title	Credit	Marks
ENG F1001	Business Communication	5.0	100
MAT F1002	Discrete Mathematics and Graph Theory	5.0	100
MCA C1003	Fundamentals of Information Technology	5.0	100
MCA C1004	Introduction to Programming through C	5.0	100
MCA C1005	Digital Logic	5.0	100
Sessional			
MCA P1006	Information Technology and Comm. Skill Lab	1.0	50
MCA P1007	LINUX & C Programming Lab	1.0	50

Semester – II

Paper Code	Title	Credit	Marks
MBA F2001	Computerized Financial Accounting	5.0	100
MCA C2002	Data Structures	5.0	100
MCA C2003	Object Oriented Programming using Java	5.0	100
MCA C2004	Operating Systems	5.0	100
MCA C2005	Computer Organisation and Architecture	5.0	100
Sessional			
MCA P2006	Data Structures Lab	1.0	50
MCA P2007	Object Oriented Programming Lab	1.0	50

Semester – III

Paper Code	Title	Credit	Marks
MCA C3001	Theory of Computation	5.0	100
MCA C3002	Software Engineering	5.0	100
MCA C3003	Computer Oriented Numerical Methods	5.0	100
MCA C3004	Database Management Systems	5.0	100
MCA C3005	Soft Computing	5.0	100
Sessional			
MCA P3006	Database Management Systems Lab	1.0	50
MCA P3007	Software Engineering Lab	1.0	50

Semester – IV

Paper Code	Title	Credit	Marks
MCA C4001	Design and Analysis of Algorithms	5.0	100
MCA C4002	Compiler Design	5.0	100
MBA C4003	Principle of Management	5.0	100
MCA C4004	Data Communications and Computer Networks	5.0	100
	Elective – 1	5.0	100
Sessional			
MCA P4005	Computer Algorithms Lab	1.0	50
MCA P4006	Elective Lab as per Elective-I	1.0	50

Semester – V

Paper Code	Title	Credit	Marks
MAT C5001	Optimization Techniques	5.0	100
MCA C5002	Data Mining and Data Warehousing	5.0	100
MCA C5003	Computer Graphics	5.0	100
MCA C5004	Cyber Laws and Information Security	5.0	100
	Elective – 2	5.0	100
Sessional			
MCA P5005	Computer Graphics Lab	1.0	50
MCA P5006	Mini Project	1.0	50

Semester – VI

Paper Code	Title	Credit	Marks
MCA C6001	Major Project	25.0	500

Elective Papers**Elective – 1**

Paper Code	Title	Credit	Marks
MCA E4007	Advance java	5.0	100
MCA E4008	Dot net	5.0	100
MCA E4009	PHP	5.0	100

Elective – 2

Paper Code	Title	Credit	Marks
MCA E5007	Wireless Communication	5.0	100
MCA E5008	Testing Methodologies	5.0	100
MCA E5009	Artificial Intelligence	5.0	100

Supportive Courses

Supportive courses for choice of student from other disciplines. The following courses will be taught to students of University Department of Computer Applications as well as of other discipline depending of their choice (any one) which will be limited to a maximum of 40 students. These courses will be offered during the fourth semester of the master program. A student will be allowed to opt for one course only the credit of which will be 5. This will not be included in the calculation of CGPA.

1. Windows
2. M.S. Office
3. Tally
4. Photoshop
5. Internet concept

The Cumulative Grade Point Average (CGPA) will be calculated on the 10 point grading scale as follows:

Grade Point	Parentage of Marks	Grade Symbol (Letter)
10	91 – 100	O (Outstanding)
09	81 –90	A+ (excellent)
08	71 –80	A (Very Good)
07	61 –70	B+ (Good)
06	51 –60	B (Above Average)
05	41 –50	C (Average)
04	33 –40	P (Pass)
00	Below 33	F (Fail or Absent)

A. For each Semester:

Semester Grade Point Average (SGPA)

$$S(j) = \frac{\sum_i C(i).G(i)}{\sum_i C(i)} \quad (i)$$

Where C(i) denotes the total credits of the ith course. G(i) denotes the grade point earned by a student in ith course and j indicates the semester.

B. For full course

$$\text{Cumulative Grade Point Average CGPA} = \frac{\sum_j C(j).S(j)}{\sum_j C(j)} \quad (ii)$$

Where C(j) denotes the total credits of the jth semester. S(j) denotes the SGPA of the jth semester.

REGULATIONS

(A) Preamble

1. The regulations herein specified applied to Master of Computer Applications (MCA) programme offered by the Vinoba Bhave University, Hazaribag, through the University Department of Computer Applications, herein after referred to as the University Department.
2. The MCA programme covered by these regulations are correlated courses of study, the successful completion of which would enable the participants of the programme to qualify for the award of MCA degree.
3. A participant of the programme is a student who is duly admitted to an institute of the university and who has registered himself/herself for a course of study and attains the same.

(B) Time scale for academic activity

1. The basic units of time for academic activity for the MCA programme shall be a semester (July to December and January to June). A basic contact period is one in which a teacher engages the student for a duration of 60 minutes.
2. If circumstances warrant, the department may schedule a summer programme during long vacation of the department. There will be in general no formal classes in the summer programme.

(C) Courses of study

The university shall offer courses during a semester indicated mainly from consideration of minimum enrollment and facilities available. The competent authority comprising of the University/Department shall have the right to cancel any or all course of study if the requirements are not satisfied.

(D) Registration for course of study

1. Every participant of the MCA programme, shall first register himself/herself for the courses of study he/she intends pursuing provided he/she possesses the minimum qualifications as laid down and his/her plan is approved by the University in the University Department of Computer Applications.
2. Fees payable by the participants including fees payable for examination shall be as laid down in administrative instructions issued from time to time by the University/Department for the purpose.

(E) Audit of the courses

All courses offered in the MCA programme will be open for audit in the spirit of offering an opportunity for continuing education for the participants who wish to refresh or update their knowledge. Audited courses shall neither count for academic credit nor shall there be any examination requirements. Participants shall be eligible to participate in the courses offered on payment of prescribed fee and due registration.

- (F) Measurement of Academic Achievement of the participating student in the MCA programme shall be measured in terms of grade obtained by him/her in the examinations. The overall performance of the students in the semester examination shall be evaluated in terms of grade point average as specified later.

(G) Assessment:

In total 160 credits represent the workload of a session for MCA program.

Total credits=160, 1 credit = 15 lecture Hrs, 100 Marks

SUBJECT (L-T-P) = (4-1-0) CREDITS and

SESSIONAL (L-T-P) = (0-0-1) CREDITS

Semester	–	I	27 credits
Semester	–	II	27 credits
Semester	–	III	27 credits
Semester	–	IV	27 credits
Semester	–	V	27 credits
Semester	–	VI	25 credits

(H) Scheme of Instruction:

The scheme of instruction in Post-Graduate Programme shall be of the following forms of academic activity:

- a) Theory
- b) Sessional
- c) Practical Training and Project Work
- d) Seminar and Tutorial

- a. **THEORY:** A theory type of academic activity shall involve concepts, fundamental ideas, and techniques, as laid down in text books or literature and which can be grasped through lectures and assignments. A theory type of course with about 60 contact periods in a semester shall enable participating student to earn one unit of academic credit provided that he/ she fulfils the attendance, and grade requirements as specified hereinafter.
- b. **SESSIONALS:** The following type of academic work will be covered in sessional:
- a) Laboratory Experiment
 - b) Design Exercise
 - c) Project
 - d) Term paper or any other academic work, the purpose of which would be to train the student by practice, repeated use and hands on experience.

A sessional course of 2 contact periods a week and about 30/40 contact period during a semester shall enable a participating student to earn one unit of academic credit provided that he/she fulfils the attendance and grade requirements as specified hereinafter.

- c. **Practical Training and Project Work:** At the end of the sixth semester of study, a student will be examined in the course "Project Work".
1. Project work may be done individually or in groups in case of bigger projects. However if project is done in groups, each student must be given a responsibility for a distinct module and care should be taken to see the progress of individual modules is independent of others.
 2. Students should take guidance from an internal guide and prepare a Project Report on "Project Work" in 2 copies to be submitted to the Director of the Institute by April. Whenever possible, a separate file containing source-code listings should also be submitted. Every student should also submit at least 4 typed copies of their project synopsis.

3. The Project Synopsis should contain an Introduction to Project, which should clearly explain the project scope in detail. Also, Data Dictionary, DFDs, ERDs, File designs and a list of output reports should be included.
4. The project Work should be of such a nature that it could prove useful or be relevant from the commercial/management angle.
5. The project report will be duly accessed by the internal guide of the subject and marks will be communicated by the Director to the University along with the marks of the internal credit for theory and practical to be communicated for all other courses.
6. The project report should be prepared in a format prescribed by the University, which also specifies the contents and methods of presentation.
7. The major project work carry 200 marks for internal assessment and 300 marks for external viva. The external viva shall be conducted by a minimum of two external examiners. The mini project work would be departmental.
8. Project work can be carried out in the Institute or outside with prior permission of the Institute.
9. Project viva-voce by the University panel will be conducted in the month of May.

(I) Attendance Requirement

All students must attend every lecture, practical classes and other activities of the Department. However, the attendance requirement will be a minimum of 75% of the classes actually held.

Absence during the semester

- a. A student must inform the HOD concerned immediately of any instance of continuous absence from classes.
- b. A student who is absent due to illness should approach the teachers concerned for makeup quizzer, assignment and laboratory work.
- c. A student has been absent from a sessional test due to illness approach the teacher concerned for makeup test immediately on return to class. The request should be supported with a medical certificate issued by a registered medical practitioner.
- d. If a student is continuously absent from the institute for more than four weeks without permission of the head of the department concerned, his/her name will be removed from institute rolls.

(J) Examination Assessment

- 1) The examination of each paper shall have two components- External evaluation (End Semester Exam) at the end of the semester carrying 70 marks to be conducted by the university and Internal evaluation of 30 marks to be evaluated by Teachers. Internal evaluation shall comprise written exam carry 20 marks of a paper. Seminars/Cultural activities/NSS be 5 marks and 5 marks for assignment.

Theory Paper----- 70 marks + 30 marks

70 marks ----- External evaluation (End Semester Exam)

30 marks----- Internal evaluation

- 2) Sessional Exam----- 50 Marks

There should be one External and one Internal examiner for each sessional Examination.

- 3) Question Paper Pattern:

The questions papers shall be set and the answer –scripts shall be evaluated by the teachers of the concerned courses. The question paper shall consists of five sections: A, B, C, D & E. Section A, B, C & D will have two questions from the respective units of the syllabus, out of which one questions will be required to be answered and will carry 10 marks each. Section E will consists of 10 short answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all, each short-answer type questions carrying 3 marks. The candidates are required to give answer of each short type question in 50 words i.e 7-10 lines.

(K) Student Discipline

Every student is required to observe a polite and disciplined behavior both inside and outside the campus and should not indulge in any activity which would tend to bring down the prestige of the institute or disturb the peaceful and congenial environment of the campus.

An act of indiscipline on the part of the student may result into adequate discredit and a mention in his/her academic grade card and/or transcript.

Note: The department in consultation with the university shall have the right to change/modify any regulation or part thereof in the academic interest of the students.

(L) DURATION OF CURRICULUM AND CALENDAR:

1. Master of Computer Applications (MCA) programme is of three years duration. Each year shall be divided into two semesters. First semester shall ordinarily being in July and end in December. Second semester shall ordinarily being in January and end in June.
2. Each year, the university shall draw an academic calendar and the same shall be non negotiable and strictly adhered to the academic calendar for the first year shall be handed over to each admitted student along with his/her university registration card. Second year academic calendar shall be made available during registration for third semester and third year calendar during registration for fifth semester.
3. The curriculum and syllabus shall be modified with approval of the academic council ordinarily once in every three years to keep the same up-to-date. However, minor modifications can be done as and when necessary with the approval of Vice-Chancellor. The modification so done shall be placed to the immediate next academic council meeting for ratification.
4. A candidate may be permitted to complete MCA degree requirements in not more than 5 years i.e. maximum in 10 semesters.

(M) ELIGIBILITY CRITERIA FOR ADMISSION:-

1. The candidate must hold a bachelor's degree (with mathematics at 10+2 level) or BCA/B.Sc. Computer Science of a recognized University incorporated by an act of the central or state legislatures in India or other educational institutions established by an act of parliament registered under section (2f)/12(B) of UGC act 1956 or declared to be deemed of an university under section 3 of UGC act, 1956 or passed an equivalent qualification recognized by the ministry of HRD, Government of India.
2. The candidate must have secured at least 50% of marks in aggregate at the graduation level.
3. Candidates appearing for the final examination of their bachelor's programme can also apply and if selected can join the programme provisionally. At the time of counseling they must bring the certificates in original.
4. At the time of the counseling candidates will be required to show their original certificates and marksheets of 10+2 and graduation level, MCA test admit card, caste certificate and any special category certificate, if any.

(N) Eligibility for Appearing in Semester Examination

1. A student shall be eligible in an examination provided he/she pursues a regular course of study and attends at least 75% of class in each theoretical and sessional subject during the semester. The attendance shall be considered from the date of admission of the candidate in the institution

Attendance record will be compiled at the time of each test and the students with poor attendance will be informed through notification. The guardian will also be informed through a letter before he/she is debarred for appearing university examination due to shortage of attendance.

2. Concessions: A student who has been absent for short periods on medical ground or due to participation in cultural, sports, other academic/official assignments in the interest of the Department/University with prior written permission of the head of the institution shall be permitted a maximum of additional concession of 10% in attendance and shall be eligible for appearing in examination with a minimum 65% of attendance in semester.
3. A student shall be admitted to any examination in a subject only if he/she has been registered for that subject.
4. A candidate shall be allowed in an examination only if he/she is issued an admit card for the relevant examination by the University/Department.

(O) PROMOTION

Advancement to the next Semester shall be permitted only with a maximum of Two Backlog Papers from the preceding Semester. Further, entry to the next Semester shall be regulated at the level of 4th, 5th and 6th Semesters as explained under:

1. Admission to 4th Semester shall be allowed only after clearing First Semester Backlog Paper(s) during Third Semester.
2. Admission to 5th Semester shall be allowed only after clearing Second Semester Backlog Paper(s) during 4th Semester.
3. Admission to 6th Semester shall be allowed only after clearing Third Semester Backlog Paper(s) during 5th Semester.
4. Backlog paper(s) of 4th Semester needs to be cleared during 6th Semester.
5. Backlog paper(s) of 5th and 6th Semesters need to be cleared during subsequent examinations for these semesters within three consequent examinations of the concerned semester with a maximum of only one chance.

Moderation of result: Notwithstanding anything contained elsewhere in the Regulations, the University shall have power to moderate the MCA results on the recommendations of the Examination Board and/or the academic council.

Normally an examinee shall be awarded up to five marks in one theory paper or three marks in two theory papers (each). If he/she fails short of pass marks in semester exam (first to fifth) or up to five marks in the aggregate. There should not be more than one benefit.

Provided further that no grace marks shall be permitted in the Practical/Viva-Voice paper.

(P) Final Result:

Semester Grade Point Average (SGPA) = (Total Points) / (Total No. of paper)

Cumulative Grade Point Average (CGPA) = (Total Semesters SGPA) / (Total Semester)

Grade will be Awarded According to the Point.

The Cumulative Grade Point Average (CGPA) will be calculated on the 10 point grading scale as follows:

Grade Point	Percentage of Marks	Grade Symbol (Letter)
10	91-100	O (Outstanding)
09	81-90	A+ (Excellent)
08	71-80	A (Very Good)
07	61-70	B+ (Good)
06	51-60	B (Above Average)
05	41-50	C (Average)
04	33-40	P (Pass)
00	Below 33	F (Fail or Absent)

The concerned teacher shall maintain all records for inspection by the University for at least one semester.

Other:

- a) Other provisions not covered under the present regulation shall be governed by the regulation for Master Examination in Arts, Science and Commerce of the university and if needed may be reviewed.
- b) Any dispute or case not covered under the above regulations shall be referred to the Vice Chancellor whose decision shall be final.

BUSSINESS COMMUNICATION

(ENG F1001)

UNIT 1: Communication Overview:

Introduction to Communication, Development of communication, Principles of Communication, Process of Communication, Barriers to Communication, Aids to Communication, The Ten Commandments, The Listening Process, Difference between Listening and Hearing, Types of Listening, Deterrents to the Listening Process, Factors that help in Listening, Strategic Manoeuvres, Effective Presentations, Seven steps to a Successful Presentation.

UNIT 2: Grammar and comprehension:

Syntax - Use of Articles in Science, The Verbs, The Prepositions, Tense, Active and Passive Construction, Common Errors, Phrase Substitution, Double blanks in a Sentence, Sentence Rearrangement, Closure Test, Antonyms and Synonyms, Comprehensions

UNIT 3: Business correspondence:

Drafting official and business letter, Circulars and official order instructions, Drafting minutes and agenda of the meeting, Formal report, Summarizing and abstracting, Expressing ideas within a restricted word limit(Precise Writing), Paragraph writing, Application Letter, Technical description of things and processes, Use of Charts, Graph and Table

UNIT 4: Advanced phonetics:

phonology and morphology including supra segmental features stress and intonation, Developing fluency and accuracy in oral communications, Authentic Pronunciation, English Phonetics spelling, Drilling and Testing of English sounds. I.C. Analysis

UNIT 5: Group discussions And Interviews:

Introduction to Group Discussion, qualities looked for in GD, Strategies For GD, Use of persuasive strategies including some rhetorical devices (for emphasizing for instance being polite and firm handling questions and taking in criticism of self), Effective interview, Enrichment of English Vocabulary - Borrowings, Words formation and its methods.

Text Book:

1. Effective Communication Skills: The Foundations for Change by John Nielsen

Reference Books:

1. Business Correspondence & Report Writing, Sharma, TMH Pub.
2. Business Communication, Kaul, PHI Publication.

DISCRETE MATHEMATICS AND GRAPH THEORY

(MAT – F1002)

UNIT 1: Fundamentals: Sets and Subsets, Operations on Sets, Properties of Integers, Mathematical Structures.

UNIT 2: Logic & Counting: Propositions and Logical Operations, Conditional Statements, Methods of Proof, Mathematical Induction. Permutation, Combination, Pigeonhole Principle, Elements of Probability.

UNIT 3: Relations and Digraphs: Product Sets and Partitions, Relations and Digraphs, Paths in a Digraph, Properties of Relations, Equivalence Relations, Computer Representation of Relations and Digraphs, Operations on Relations, Transitive Closure and Warshall's Algorithm.

UNIT 4: Functions , Order Relations and Structures: Functions, Functions for Computer Science, Growth of Functions, Permutation Functions. Partial Ordered Sets, External Elements of Partially Ordered Sets, Lattices, Finite Boolean Algebra, Circuit Design.

UNIT 5: Trees: Trees, Labelled Trees, Tree Searching, Undirected Trees, Minimum Spanning Trees. **Semigroups and Groups:** Binary Operations, Semigroups, Products and Quotients of Semigroups, Groups, Products and Quotients of Groups.

Text Book:

1. Discrete Mathematical Structures, Kolman, Busby, Ross, 5th Edition, Pearson Education.

Reference Books:

1. R.Johnsonbargh- Discrete Mathematics, 6th Edn, Pearson Education, New Delhi- 2007.
2. K.H.Rosen- Discrete Mathematics and Its Applications, 4th Edn, TMH, New Delhi- 2001
- 3 Discrete mathematics by K. B. Ross
- 4 Elements of discrete structure by CLLIV
- 5 Discrete mathematics, J. K. Sharma

FUNDAMENTALS OF INFORMATION TECHNOLOGY

(MCA C1003)

UNIT 1: Introduction To Computers and Computer Network: Introduction, Characteristics of Computers, Evolution of Computers, Evolution of Computers, Generations Of Computers, Classification of Computers, The Computer System, Application of Computers. Introduction, Data Communication, Transmission Media, Multiplexing, Switching, Computer Network, Network Topologies, Communication Protocols, Network Devices.

UNIT 2: Number Systems, Logic Gates and Computer Architecture: Introduction, Number Systems, Conversion between Number Bases, Arithmetic System, Concept of Overflow, Binary Coding, Logic Gates, Boolean algebra, Combination of Logic Gates. Central Processing Unit, Memory, Communication between Various Units of a Computer System, Processor Speed, Multiprocessor Systems.

UNIT 3: Primary Memory, Secondary Memory and Operating System: Introduction, Memory Hierarchy, Random Access Memory (RAM), Types Of RAM, Read Only Memory (ROM), Types Of ROM, Classification of Secondary Storage Devices, Magnetic Tape, Magnetic Disk, Optical Disk Operating System, Evolution of Operating System, Types of Operating System, Functions of an Operating System, Modern Operating Systems.

UNIT 4: Computer Languages & Computer Software: Introduction, Evolution of Programming Languages, Classification of Programming Languages, Generations of Programming Languages, Features of a Good Programming Language, Selection of a Programming Language, Software: Definition, Relationship between Software and Hardware, Software Categories, System Software, Application Software, Software Terminology.

UNIT 5: Internet Basics: Introduction, Evolution of Internet, Basic Internet Terms, Getting Connected To Internet, Internet Applications, Electronic Mail- An Introduction, How Email Works, Search Engines, Languages of Internet, Internet and viruses.

Text book:

1. Introduction to Computer Science- ITL Education Solutions Limited, Pearson Education, 2004.

Reference Books:

- 1.N.Nilsan & S.Schochen-The Elements of Computing Systems
- 2.Fundamentals of Information Technology by Deepak Bharihoke
- 3.Fundamentals of Information Technology by Deepak Bharihoke
- 4.Principles of Information Systems by Ralph Stair and George Reynolds
- 5.Fundamentals of Information Systems (with Printed Access Card) by Ralph Stair and George Reynolds.

INTRODUCTION TO PROGRAMMING THROUGH C (MCA C1004)

UNIT 1: *Problem Solving and Programming Concepts:* Problem Solving in Everyday Life, Types of Problem, Problem Solving with Computers, Constants and Variables, Data Types, Functions, Operators, Expressions and Equations, Data Storage and Communication with Computer, Organizing the Problem, Computer Software and Software Development Method.

Overview of C: C Language Elements, Variable Declaration, Data Types, Expressions, Data Files. ***Top-Down Design with Functions:*** Top-Down Design and Structure Charts, Functions without Arguments, Functions with Input Arguments.

UNIT 2: *Selection Structures:* Problem Solving with Decisions, Control Structures, Conditions, All kinds of if statements, Switch statement. ***Repetition and Loop Statements:*** Problem Solving with Loops, Repetition in Programs, while Statement, for Statement, Conditional Loops, Loop Design, Nested Loops, do-while Statement and Flag Controlled Loops.

UNIT 3: *Modular Programming:* Functions with Simple Output Parameters, Multiple Calls to a Function with Input/Output Parameters, Scope of Names, Formal Output Parameters as Actual Arguments. ***Arrays:*** Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Using Array Elements as Function Arguments, Array Arguments, Multidimensional Arrays. ***Strings:*** String Basics, String Comparison, Arrays of Pointer, Character Operations, String-to-Number and Number-to-String Conversions.

UNIT 4: *Recursion:* The Nature of Recursion, Tracing a Recursive Function, Recursive Mathematical Functions, Recursive Functions with Array and String Parameters, Problem Solving with Recursion. ***Structure and Union Types:*** User-Defined Structure types, Structure Type Data as Input and Output Parameters, Functions Whose Result Values are Structured, Problem Solving with Structure Types, Union types.

UNIT 5: *File Processing and Programming in the Large:* Input and Output Files, Binary Files, Using Abstraction to Manage Complexity, Header Files, Implementation Files, Storage Classes, Macros.

Text Books:

1. M.Sprankle- Problem Solving and Programming Concepts, 7th Edn, Pearson Education, New Delhi-2006
2. J.R.Hanly & E.B. Koffman- Problem Solving and Program Design in C, 4th Edn, Pearson Education, New Delhi-2004.

Reference Books:

1. E.Balagurusamy- Programs in ANSI C, 3rd Edn, TMH, New Delhi-2004
2. The C programming language.- D. Ritchie & B. Kaningham
3. B.A.Forouzan & R.F. Gilberg- Computer Science: A structured Programming Approach Using C, 2nd Edn, Brooks/Cole- Thomson Learning, Indian Reprint,2003.

DIGITAL LOGIC (MCA C1005)

UNIT 1: Number Systems

Binary, Octal, Decimal, Hexadecimal Number System. Number base Conversion, Complements, and Signed binary numbers. Binary Arithmetic, Binary codes: Weighted-BCD, 2421, Gray code, Excess-3 code, ASCII, Error detecting code, Conversion from one base to another, Boolean postulates and laws, Demorgan's Theorem, Principle of duality, Boolean expression, Boolean function, Minimization of Boolean expressions, Sum of Products (SOP), Product of Sums (POS), Minterm, Maxterm, Canonical forms, Conversion between Canonical forms, Karnaugh map minimization, Don't Care Conditions.

UNIT 2: Logic Gates

AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR, Implementations of logic functions using gates.

UNIT 3: Combinational Circuits

Design Procedure, Adders, Subtractors, Parallel adder/subtractor, BCD adder, Magnitude Comparator, Multiplexer/Demultiplexer, Encoder/Decoder, Parity Checker, Code Conversion. Implementation of Combinational logic using MUX, ROM.

UNIT 4: Sequential Circuits.

Flip Flops, SR, JK, T, D and Master Slave, Characteristic Table and equation. Application table, Triggering of flip flop, Realization of one flip flop using other flip flops. Asynchronous/Ripple Counters, Synchronous Counters. Shift registers, registers, Universal shift registers.

UNIT 5: Memory Devices

Classification of memories: RAM organization, Write operation, Read operation. ROM organization - PROM, EPROM, EEPROM, EAPROM, Programmable logic devices - PLA, PAL.

Text Book:

1. M. Morris Mano and Michael D. Ciletti, Digital Design .4TH edition (2007), PHI Publication.

Reference Books:

1. Modern Digital Electronics 4th Edition, R.P. Jain T.M.H Publication (2006).
2. Digital Fundamentals Thomas s Floyd, 10th Edn, New Riders Press(2009).
3. Digital design and computer organization, by Nasib s.Gill, J.b Dixit.
4. Digital logic and design, N. Manna, S. Ghosh .
5. Digital Design and Computer Organization , 4th Edition David Harris, Sarah Harris, MORGAN KAUFMANN PUBLISHERS.

INFORMATION TECHNOLOGY AND COMMUNICATION SKILL LAB
(MCA P1006)

Experiment problems of the Paper ENG F10001 and MCA C1003.

LINUX AND C PROGRAMMING LAB
(MCA P1007)

Experiment problems of the Linux and Paper MCA C1004.

COMPUTERIZED FINANCIAL ACCOUNTING (MBA F2001)

UNIT 1: Introduction: Origin, People Interested in Accounts, Concepts & Conventions System of Accounting, Accounting Standards Book-Keeping, Double Entry, Classification of Business Accounts, “Golden Rules”, Journal, Subsidiary Books, Ledger Posting & Balancing, Concept of Trial Balance, Errors and Omission, Commission, Principle and Compensating, Final Accounts with Adjustments, Introduction to Financial Accounting, (Tally 7.2), Creating Company Master, Modification & Deletion.

UNIT 2: Definition, Aims, Traditional vs. Innovative Management Accounting Practices, Development of Throughput Accounting, An Alternative view of Management Accounting, Lean Accounting(Accounting for Lean), Related Qualifications, Concept of Financial Budgeting, Fund Flow, Cash Flow Statement, C-V-P Analysis, MIS in Report Preparation, SFC and DFD, Working of FM Module of SAP Transaction.

UNIT 3: Voucher Entry: Receipt Voucher, Payments Voucher, Contra Voucher, Journal Voucher, Physical Stock Voucher, Stores Ledger Book Keeping Through MM Module of SAP Transaction.

UNIT 4: Inventory Information: Stock Groups, Unit of Memo, Go Down Items, Warehousing, Displaying and Alerting and Stock Keeping.

UNIT 5: Invoice: Preparation of Invoice, Entry, Inco-Terms, Tax Implication, CENVAT and Concept of CVED, Printing & Display.

UNIT 6: Report Generation: Ledger, Poster, Trial Balance, Balance Sheet, Profit and Loss Accounts, Stock Summary, Day Book, Accounts Books, Cash Book, Bank Book, Outstanding Register.

Text Books:

1. S.N. Maheshwari- Advance Accountancy, Vikas Publication
2. Amitabh Mukherjee & Md Hanif- Modern Accountancy, TMH Publication

DATA STRUCTURES (MCA C2002)

UNIT 1: *Introduction:* Pseudocode, The Abstract Data Type, Algorithm Efficiency.

Recursion: Factorial – A Case Study, How Recursion Works, Designing Recursive Algorithms, Another Case Study- Fibonacci Numbers, The Towers of Hanoi.

UNIT 2: *Linked Lists:* List Searches, Linear List Concepts, Linked List Concepts, Linked List Algorithms, Processing a Linked List, List Applications, Complex Linked List Structures, List Abstract Data Type-Linked List Implementation.

UNIT 3: *Stacks:* Basic Stack Operations, Stack Linked List Implementation, Stack Applications, Stack Abstract Data Type Implementation, Stack ADT- Array Implementation.

Queues: Queue Operations, Queue Linked List Design, Queuing Theory, Queue Applications, Queue ADT-Linked List Implementation, Queue ADT-Array Implementation.

UNIT 4: *Introduction to Trees:* Basic Tree Concepts, Binary Trees, Binary Tree Traversals, Expression Trees, General Trees, Huffman Code.

Search Trees: Binary Search Trees, AVL Trees, AVL Tree Implementation, AVL Abstract Data Type.

Multway Trees: m-Way Search Trees, B-Trees, Simplified B-Trees. *Sorting Concepts:* General Sort Concepts, Insertion Sorts, Selection Sorts, Exchange Sorts, External Sorts.

UNIT 5: *Heaps:* Heap Definition, Heap Structure, Basic Heap Algorithms, Heap Data Structure, Heap Algorithms, Heap Applications.

Text Book:

1. R.F.Gilberg & B.A. Forouzan- Data Structures: A Pseudocode Approach with C++, 2nd Edn, Brooks/Cole- Thomson Learning, Indian Reprint, 2005.

Reference Books:

1. E.Horowitz et.al-Fundamentals of Data Structures in C++, Galgotia Publication, New Delhi, 2006.
2. A.M.Berman- Data Structures via C++, Oxford Univ. Press, Inc. Indian Reprint, 2002.
3. M.T.Goodrich et.al- Data Structures and Algorithms in C++, John Wiley, Inc. Indian Reprint, 2004.
4. Data structure using C : Tanenbaum.

OBJECT ORIENTED PROGRAMMING USING JAVA (MCA C2003)

UNIT 1: Principles of Object-oriented Programming: Object-oriented Programming Paradigm, Basic Concepts of Object-oriented Programming, Benefits of OOPs, Object-oriented Languages, Application of OOP, Creating the Source File, Compiling and Linking. **Tokens, Expressions and Control Structure:** Introduction, Tokens, Keywords, Identifiers, Basic Data Types, User Defined Data Types, Derived Data Types, Symbolic Constants, Type Compatibility, Declaration of Variables, Dynamic Initialization of Variables, Reference Variables, Operators, Expressions and Implicit Conversions, Operator Precedence, Control Structures.

UNIT 2: Classes and Objects: Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods. Arrays within a Class, Memory Allocation for Objects, Static Data Member, Static Member Functions, Arrays of Objects, Objects as Function Arguments.

UNIT 3: Inheritances : Extending Class: Inheritance : Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control. **Interface & Packages :** One-Dimensional & two Dimensional, strings, Vectors, wrapper Classes, Defining Interface, Extending Interface, Implementing Interface, Accessing Interface, Variable, System Packages, Using System Package, Adding a Class to a Package, Hiding Classes.

UNIT 4: Threads: Creating Threads. Extending the Threads Class, Stopping and Blocking a Thread, Life-Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface.

UNIT 5: Applets: Local and Remote Applets Vs Applications Writing Applets, Applets Life-Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display, HTML Tags & Applets, Getting Input from the User.

Text Book:

1. Richard A. Johnson, “ An Introduction to Java Programming and Object-Oriented Application Development”, 1st Edn., Thomson Learning, New Delhi – 2007

Reference Books:

1. Simply Java and Introductions to JAVA Programming, James R Levenick
2. Java 2 complete, sybax
3. Java 6 Programming Black Book, Dream Teach
4. Programming with JAVA, E. Balaguruswamy

OPERATING SYSTEMS

(MCA C2004)

UNIT 1: Introduction: Introduction to OS Operating system functions, evaluation of O.S., Different types of O.S. batch, multi-programmed, time-sharing, real-time, distributed, parallel. *System Structure* Computer system operation, I/O structure, storage structure, storage hierarchy, different types of protections, operating system structure (simple, layered, virtual machine), O/S services, system calls.

UNIT 2: Processes: Concept of processes, process scheduling, operations on processes, operating processes, inter-process communication. *Process Synchronization:* background, critical section problem, critical region, synchronization hardware, classical problems of synchronization, semaphores. *Threads:* overview, benefits of threads, user and kernel threads. *CPU scheduling :* scheduling criteria, preemptive & non-preemptive scheduling, scheduling algorithms (FCFS, SJF, RR, priority), algorithm evaluation, multi-processor scheduling.

UNIT 3: Deadlocks: system model, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock. *Memory Management:* background, logical vs. physical address space, swapping, contiguous memory allocation, paging, segmentation, segmentation with paging. *Virtual Memory :* background, demand paging, performance, page replacement, page replacement algorithms (FCFS, LRU), allocation of frames, thrashing.

UNIT 4: File Systems: file concept, access methods, directory structure, file system structure, allocation methods (contiguous, linked, indexed), free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency & performance. *I/O Management:* I/O hardware, polling, interrupts, DMA, application I/O interface (block and character devices, network devices, clocks and timers, blocking and nonblocking I/O), kernel I/O subsystem (scheduling, buffering, caching, spooling and device reservation, error handling), performance.

UNIT 5: Disk Management: disk structure, disk scheduling (FCFS, SSTF, SCAN,C-SCAN) , disk reliability, disk formatting, boot block, bad blocks. *Protection & Security:* Protection & Security Goals of protection, domain of protection, security problem, authentication, one time password, program threats, system threats, threat monitoring, encryption.

Text Book:

1. A. Silberschatz, Galvin,-Operating System Concepts, 6th Edn, John Wiley, Indian Reprint, 2003.

Reference Books:

1. C.Cronsley-Operating Systems: A Design-Oriented Approach, TMH, New Delhi, 2002.
2. H.M.Deitel-Operating Systems, 2nd Edn, Pearson Education, 2003.
3. A.S.Tanenbaum-Operating System:Design and Implementation, PHI, New Delhi, 2002.m.
4. The UNIX Operating Systems – Morris Bach.

COMPUTER ORGANIZATION & ARCHITECTURE

(MCA C2005)

UNIT 1: Concepts & Terminology: Digital computer concepts; Von-Neumann concept; Hardware & Software and their nature ; structure & functions of a computer system , Role of operating System.

UNIT 2: Memory Unit: Memory classification , characteristics ; Organization of RAM , address decoding ROM/PROM/EEPROM ; Magnetic memories , recording formats & methods , Disk & tape units; Concept of memory map , memory hierarchy , Associative memory organization ; Cache introduction , techniques to reduce cache misses , concept of virtual memory & paging.

UNIT 3: CPU Design: The ALU – ALU organization , Integer representation , 1s and 2s complement arithmetic ; Serial & Parallel Address; implementation of high speed Address Carry Look Ahead & carry Save Address; Multiplication of signed binary numbers-Booth's algorithm ; Divide algorithms- Restoring & Non-Restoring ; Floating point number arithmetic; Overflow Detection, status flags.

UNIT 4: Instruction Set Architecture- Choice of instruction set; Instruction word formats ; Addressing modes. Control Design – Timing diagrams; T-States, Controlling arithmetic & logic instruction, control structures ; Hardwired & Micro programmed, CISC & RISC characteristics.

UNIT 5: Pipelining - General concept , speed up , instruction & arithmetic pipeline; Examples of some pipeline in modern processors , pipeline hazards; Flynn's classification – SISD, SIMD, MISD, MIMD architectures-Vector and Array processors & their comparison , Concept of Multiprocessor; Centralized & distributed architectures. Input/output Organization: Introduction to Bus architecture, effect of bus widths, Programmed & Interrupt I/O , DMA.

Text Book:

1. William Stallings- Computer Organization & Architecture: Designing for Performance, 7th Edn, Pearson Education, New Delhi-2006.

Reference Books:

1. C. Hamacher- Computer Organization, 5th Edn, McGraw Hill, International Education, New Delhi-2002.
2. M.M.Mano- Computer System Architecture, 3rd Edn, PHI/Pearson Education, New Delhi-2006.
3. J.P.Hayes- Computer Architecture and Organization, 3rd Edn, McGraw Hill, International Edn, New Delhi-1998.
4. Computer Architecture:A Quantative Approach, 4th edition , Jhon L. Hennessy and David A. Patterson. MORGAN KAUFMANN PUBLISHERS
5. Computer Organization and Design , 4th Edition Jhon L. Hennessy and David A. Patterson. MORGAN KAUFMANN PUBLISHERS`.

DATA STRUCTURE LAB
(MCA P2006)

Experiment problems of the Paper MCA C2002.

OBJECT ORIENTED PROGRAMMING LAB
(MCA P2007)

Experiment problems of the Paper MCA C2003.

THEORY OF COMPUTATION

(MCA C3001)

UNIT 1: Basic Mathematical Objects and Mathematical Induction: Sets, logic, Functions, Relations, Alphabets, Strings, Languages, Principle of mathematical induction, Recursive definition. **Regular Expressions and Finite Automata:** Regular languages and Regular Expressions, Memory required to recognize a language, Finite Automata, capability & limitations of FSM, Deterministic Finite Automata, Non-Deterministic Finite Automata, NFA with ϵ -moves, regular sets & regular expressions, Equivalence of DFA and NFA, NFA from regular expressions, regular expressions from DFA, Moore versus Mealy m/c, two way finite automata equivalence with one way, Kleen's Theorem, applications of finite automata.

UNIT 2: Regular and Non-regular languages: Criterion for Regularity, Minimal Finite Automata, Pumping Lemma for Regular Languages, Decision problems, Regular Languages and Computers. **Context Free Grammars:** Introduction, definition, Regular Grammar, Derivation trees, Ambiguity, Simplified forms and Normal Forms, Applications.

UNIT 3: Pushdown Automata : Definition, Moves, Instantaneous Descriptions, Language recognized by PDA, Deterministic PDA, Acceptance by final state & empty stack, Equivalence of PDA, Pumping lemma for CFL, Interaction and Complements of CFL, Decision algorithms. **Turing Machines:** Definition and examples, Computing Partial Functions with Turing Machine(TM), Combining TMs, Variations of TMs, Multi-tape TMs, Non-deterministic TM, Universal TM, Church Thesis.

UNIT 4: Recursively Enumerable Languages: Recursively Enumerable and Recursive, Enumerating Language, Context Sensitive and Chomsky Hierarchy. **Unsolvability Problems and Computable Functions:** Non-recursive Language and unsolvable Problems, Halting Problem, Rice Theorem, Post Correspondence Problem.

UNIT 5: Computational Complexity: Discussion on P, NP, NPC and NP-Hard Problems.

Text Books :

1. John Martin -"Introduction to Languages and the Theory of Computation", 3rd edition, TMH.

Reference Books:

1. K.L.P Mishra & N. Chandrasekharan -"Theory of Computer Science", PHI
2. Hopcroft JE. And Ullman JD -"Introduction to Automata Theory, Languages & Computation", Narosa.
3. Lewis H. R. and Papadimitrou C. H -"Elements of the theory of Computation", PHI.

SOFTWARE ENGINEERING

(MCA C3002)

UNIT 1: Introduction to Software Engineering: Evolving Role of Software, Changing Nature of Software, Legacy Software, Software Engineering – A layered Technology. Software Characteristics, Software Application, Software Engineering Process and Design Model, Waterfall Model, Incremental Process Models, Prototype Model, Spiral Model, Evolutionary Process Models, Agile Process Model.

UNIT 2: Requirement & Design Engineering: A bridge to design and construction, Requirement Engineering Task, Initiating the Requirement Engineering Process, Eliciting Requirements, Developing Use case, Building the Analysis Model, Negotiating Requirements, Validating Requirements, Design Process and Design Quality, Design Concepts, Design Models, Pattern Based Software Design.

UNIT 3: Testing Strategies and Testing Tactics: Strategic Approach to software Testing, Verification and Validation Testing, White Box Testing, Basic Path Testing Control Structure Testing, Black Box Testing, Object Oriented Testing Methods. Dynamic Testing, Unit Testing, White-box And Black-box Testing, Test Case Generation, Integration Testing, Bottom-up and Top-down Testing, System Testing, Function Testing, Performance Testing, Acceptance Testing, Installation Testing,

UNIT 4: Software Metrics and Project Management: Issues in Project Management, Management Functions, Software Project Management Plan, Software Management Structure, Personnel Productivity, Software Project Complexity. Software Metrics – Basic Consideration, Size Oriented and Function Point Oriented; Software Cost Estimation Techniques, Algorithmic Cost Modeling, The COCOMO Model, Project Scheduling, Software Project Planning, Scheduling Risk Management.

UNIT 5: Software Quality and Configuration Management: Quality Concepts, Software Quality Assurance, Software Reliability, Software Configuration Management, SCM Repository, SCM Process.

Text Book:

1. Roger S. Pressiman – “Software Engineering – A Practitioner’s Approach”, 6th Edn., McGraw Hill.

Reference Books:

1. John Wiley and Sons – “ Software Engineering – Principles and Practice –2nd Edn., Haus Van Vliet.
2. Ian Sommerville – “Software Engineering”, 7th Edn., Pearson Education.
3. *Karl E. Wiegers* Software Requirements (2nd Edition)
4. *Grady Booch, etc.* Object-Oriented Analysis and Design with Applications (3rd Edition)
5. *Cem Kaner*, Testing Computer Software (2nd Edition)

COMPUTER ORIENTED NUMERICAL METHODS

(MCA C3003)

UNIT 1: Errors in Numerical Calculations: Errors & their computation-absolute, relative & percentage. **Solution of algebraic & transcendental equations:** Introduction, Bisection method, Iterative method, False position method, Newton's Raphson method, Lin Bairstows method. Error analysis & convergence study.

UNIT 2: Interpolation with equal & unequal intervals: Introduction, finite differences-forward, backward & central, difference tables, differences of polynomials, Newton's formula for interpolation, Gauss's central difference interpolation formula, Divided difference & their properties- Newton's divided differences formula, Lagrange's interpolation formula, Inverse interpolation.

UNIT 3: Numerical differential & integration: Introduction, derivatives using forward & backward difference formula, Numerical Integration-Trapezoidal rule, Simpson's 1/3 & 3/8 rules Weddle's rule.

UNIT 4: Numerical solution of linear system of equations: Direct method-Gauss elimination, Gauss-Jordan, LU decomposition methods. Iterative methods-Gauss-Jacobi & Gauss Seidel methods.

UNIT 5: Numerical solution ordinary differential equations: Taylor Series method, Euler's method, Modified Euler's method, Runge-Kutta methods of 2nd & 4th order, Predictor- Corrector methods (Milne's method and Adam's methods).

Text Books:

1. S.S.Sastry-Introductory Methods of Numerical Analysis-PHI, Private Ltd., New Delhi.

Reference Books:

1. . R.L.Burden & J.D.Faires- Numerical Analysis, Thomson Learning-Brooks/Cole, Indian Reprint, 2005.

DATABASE MANAGEMENT SYSTEMS

(MCA C3004)

UNIT 1: Introduction: File systems versus Database systems, Advantages of DBMS, DBMS classification/types, DBMS structure, three schema DBMS architecture, Data Models, Data Independence, Data abstraction, Database Users, Database Schemas and Database Instances, Views and its advantages, Data dictionary, DBA and its functions, RDBMS, Difference between DBMS and RDBMS.

UNIT 2: E-R-Model & Relational Model: Entities and Entity Sets, Relationships and Relationship Sets, Keys, Mapping, Constraints, ER Diagram, Reducing ER Diagram to tables, Specialization, Generalization and Aggregation. Codd's rule, RDBMS Concepts, Types of Keys, Constraints, Relational database Scheme, Procedural & Non Procedural Languages, Relational Algebra, Relational Calculus.

UNIT 3: SQL/PLSQL: Basic Concepts, Basic SQL, Advance SQL, Database languages, Set operations, Aggregate Functions, Null Values, assertions, views, Nested Sub-queries, Integrity Constraints, Domain Constraints, Referential Integrity Constraints, Indexing and Hashing, Cursors, Stored procedures and triggers .

UNIT 4: Database Design: Pitfalls in relational database design, Normalization using functional, Multivalued and join dependencies, Atomic values, alternative approaches to database design. Full and Partial Functional Dependency, Armstrong's axioms, Canonical Cover, 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, DKNF .

UNIT 5: Transaction Processing and Concurrency Control: DBMS Transaction, ACID Properties, Serializability, States of Transaction, DBMS Concurrency control, DBMS deadlock, Deadlock Prevention, Deadlock avoidance, Schedules and Recovery, Locking and Timestamp Ordering for concurrency control.

Text Book:

1. Fundamentals of Database Systems "Ramez Elmasri", Pearson Education.

Reference Books:

1. Database Systems Concepts "A. Silberschatz, Korth", McGraw Hill.
2. Database Management Systems by Ragu Ramakrishnan and Johannes Gehrke
3. SQL Solutions for IBM DBMS (Vnr Computer Library) by Bruce L. Larson
4. Database Management Systems (DBMS) by Icon Group International
5. Database Systems Concepts "KORTH"

SOFT COMPUTING

(MCA C3005)

UNIT 1: Introduction To Artificial Intelligence System, Neural Network, Fuzzy Logic & Genetic Algorithm. Fuzzy Set Theory : Fuzzy Versus Crisp, Crisp Set, Fuzzy Set, Crisp Relation, Fuzzy Relations. Fuzzy System: Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Rule Based System, Defuzzification Methods, Applications. Genetic Algorithms, Basic Concepts, Creation Of Offspring, Working Principle, Encoding, Fitness Function, Reproduction.

UNIT 2: Genetic Modelling, Inheritance Operations, Cross Over, Inversion And Deletion, Mutation Operator, Bit Wise Operators, Generation Cycle, Convergence Of Genetic Algorithm, Application, Multi Level Optimization, Real Life Problems, Difference And Similarities Between GA And Other Traditional Methods, Advanced In GA.

UNIT 3: Fundamentals Of Neural Networks, Basic Concepts Of Neural Network, Human Brain, Model Of An Artificial Neuron, Neural Network Architectures, Characteristic Of Neural Networks, Learning Method, Taxonomy Of Neural Network Architectures, History Of Neural Network Research, Early Neural Network Architectures, Some Application Domains.

UNIT 4: Back Propagation Network Architecture Of Back Propagation Network, Back Propagation Learning, Illustration, Applications, Effect Of Tuning Parameters Of The Back Propagation Neural Network, Selection Of Various Parameters In BPN, Variations Of Standard Back Propagation Algorithm.

UNIT 5: Associative Memory And Adaptive Resonance Theory, Autocorrelators, Heterocorrelators, Multiple Training Encoding Strategy, Exponential BAM, Associative Memory For Real Coded Pattern Pairs, Applications, Introduction To Adaptive Resonance Theory, ARTI, Character Recognition Using ARTI

Text Book:

1. S. Rajasekharan & G. A. Vijayalakshmi – “ Neural Network, Fuzzy Logic And Genetic Algorithm Synthesis And Applications”, Prentice Hall Of India PLT, Pai – 2004

Reference Books:

1. Jyh – Shing R Jang, C. T. Sun, E Mizutani – Neuro Fuzzy And Soft Computing – A Computational Approach To Learning And Machine Intelligence”, Prentice Hall Of India – 1997.

DATABASE MANAGEMENT SYSTEMS LAB
(MCA P3006)

Experiment problems of the Paper MCA C3004.

SOFTWARE ENGINEERING LAB
(MCA P3007)

Experiment problems of the Paper MCA C3002 AND MCA C3003

DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS (MCA C4001)

UNIT 1: Introduction and Analysis of Algorithm: Introduction, Problems and instances, The efficiency of algorithms, Average and worst-case analyses, What is an elementary operation, why look for efficiency, Asymptotic notations ,A notation for “the order of”, Other asymptotic notation, Asymptotic notation with several parameters, Operations on asymptotic notation., Analysing control structures, Average-case analysis, Amortized analysis, Solving Recurrences.

UNIT 2: Divide-and-conquer: Introduction: Multiplying large integers, The general template, Binary search, Sorting, Finding the median, Matrix Multiplication, Exponentiation

Greedy Algorithms: General characteristics of greedy algorithms, Graphs: Minimum spanning trees, Dijkstra’s Shortest paths, The knapsack problem, scheduling, Huffman codes.

UNIT 3: Dynamic Programming: Calculation the binomial coefficient, The World Series, Making change, The principle of optimality, The knapsack problem, Flloyed-warshal’s Shortest paths, Chained matrix multiplication, Longest common subsequences.

UNIT 4: Exploring Graphs : Graphs and games: An introduction, Traversing trees, Depth-first search: Undirected graphs, Depth-first search: directed graphs, Breadth-first search, Backtracking, Branch-and-bound, the minimax principle.

UNIT 5: Probabilistic Algorithms: Introduction, Probabilistic does not imply uncertain, Expected versus average time, Pseudorandom generation, Numerical probabilistic algorithms, Monte Carlo algorithms, Las Vegas algorithms.

Text Book:

1. G Brassard & P Bratley - Fundamentals of Algorithms PHI, New Delhi, 2005

Reference Books:

1. E.Horowitz. et.al.- Fundamentals of Computer Algorithms, Galgotia Publication Pvt. Ltd., New Delhi, 2004
2. J.Kleinberg & E. Tardos – Algorithm Design, Pearson Education, New Delhi, 2006
3. T.H. Cormen et.al. – Introduction to Algorithms – PHI, New Delhi, 2005
4. S. Dasgupta et.al. – Algorithm, TMH, New Delhi – 2007
5. S. Sahani – Data Structures, Algorithms and Applications in C++ 2nd Edition, Universities Press (India) Pvt. Ltd., 2005
6. Design & analysis of computer algorithm- Aho, Ullman, Hopcroft
7. Introduction to the Design and analysis of algo. – Anany Levitin.

COMPILER DESIGN

(MCA C4002)

UNIT 1: Introduction to Compiler:

Compilers, Analysis of the source program, The phases of the compiler, Major data structures in a Compiler, Issues in a Compiler Structure, Bootstrapping and Porting
Scanning : Scanning Process, Regular Expression(R.E.), Finite Automata(F.A.), R.E. to DFA, Implementation of Scanner, Use of Lex to generate a Scanner.

UNIT 2: Context Free Grammar and Parsing: Parsing Process, The role of a parser, Context Free Grammar, Parse trees and Abstract Syntax trees, Ambiguity, EBNF, Formal properties of Context Free Languages.

Top-down Parsing: Top down Parsing by Recursive Descent, LL(1), First and Follow sets, Recursive Descent Parser for a Tiny language, Error Recovery in Top-down Parser.

Bottom-up Parsing : Overview of Bottom-up Parsing, LR(0) items and LR(0) Parsing, SLR(1), General LR(1) and LALR(1) Parsing, YACC , Error Recovery in Bottom-up Parser.

UNIT 3: Semantic Analysis: Attributes and Attributes Grammars, Algorithms for Attribute Computation, Symbol Table, Data types and Data type Checking, Semantic Analyzer for Tiny language.

UNIT 4: Run-time Environments : Memory organization during program execution, Fully static run-time environment, Stack-based run-time environments, Dynamic memory, Parameter passing mechanism, Run-time environment for Tiny language.

UNIT 5: Code Generation: Intermediate code and data structures for code generation, Basic code generation techniques, Code generation of Control statements and Logical expressions,

Text Book:

1. Kenneth C. Louden -“Compiler Construction – Principle and Practice”, Thomson 2007.

Reference Books:

1. Aho, Sethi, Ullman -“Compiler Principles, Techniques and Tools”, Pearson Education, 2007.
2. The Compiler Design Handbook: Optimizations and Machine Code Generation, Second Edition by Y.N. Srikant and Priti Shankar
3. A Retargetable C Compiler: Design and Implementation by David R. Hanson and Christopher W. Fraser
4. Compiler Design (International Computer Science Series) by Renhard Wilhelm and Dieter Maure

PRINCIPLES OF MANAGEMENT

(MBA C4003)

UNIT 1: MANAGEMENT: SCIENCE, THEORY, PRACTICES AND THOUGHTS

Definition/Importance, Meaning of Management, Management as a Noun, management as a process, Management as a Discipline, Management Functions Role of a Manager, Levels of Management, Managerial Skills, Characteristics of Management, Management as an ART or Science, Principles of Management, Ethics in Managing, Management by Objectives, Early Management Approaches, Modern Management Approaches.

UNIT 2: PLANNING AND DECISION MAKING

Objectives of Planning, Forms of Planning, Types of Planning, Steps in Planning, Factors to Make Planning, Effective Meaning of Decision, Types of Decision, Rationality in Decision Making, Steps in Rational Decision Making, Modern Approach to Decision Making, Decision Making under Certainty, Uncertainty and Risk

UNIT 3: COORDINATION, BUSINESS FORECASTING AND ORGANIZATION

Definition, Need and Importance of Coordination, Type of Coordination, Principles of Coordination, Techniques of effective Coordination, Factors Affecting Forecasting, Definition, Formal and Informal Organization, Organizational Division, Organizational Levels & Span of Management, Types of Informal Organization, Distinction between Formal and Informal Organization Group Dynamics

UNIT 4: AUTHORITY DELEGATION, DECENTRALIZATION AND LINE AND STAFF RELATIONSHIP

Meaning of Delegation of Authority, Advantages of Effective Delegation, Barriers to Effective Delegation, Meaning of Decentralization of Authority, Advantages of Decentralization, Distinction between Authority and Power, Man Power Planning, Definition of Staffing, Requirement, Selection Process of Selection, Skills and Personal Characteristics Needed by Managers, Purpose of Performance Appraisal, Manager Development Process and Training Performance Appraisal Criteria, Behavioral Model.

UNIT 5: LEADERSHIP AND CONTROLLING

Definition, Characteristics of Good Leader, Functions of a Leader, Approaches to Leadership, Definition of Managerial Control, Characteristics of Control, Scope of Control, Basic Steps in Control, Control Techniques.

Text Book:

1. Principles of Management, Harold Koontz, TMH.

Reference Books :

1. Essential of Managements, Harold Koontz, International Perspective.
2. Principles and Practice of Management, Dr. S.C. Saksena
3. Principles and Practice of Management, L.M. Prasad

DATA COMMUNICATIONS AND COMPUTER NETWORKS (MCA C4004)

UNIT 1: *Introduction:* Introduction, Types and Applications of Network, Reference models:OSI, TCP/IP.

Signals: Analog, Digital, Digital transmission - Coding, Sampling, Analog Transmission - Modulation of Digital and analog signals, Multiplexing, Switching, Transmission Media, Transmission impairment.

UNIT 2: *Data Link Layer:*

Responsibilities of DLL: Services to network layer, Framing, Error control, Flow control. Error detection and correction: Hamming distance, Cyclic Redundancy Check.

DLL Protocol : Stop-and-Wait , Sliding window protocol, Piggybacking, Go-Back-N, Selective repeat.

MAC sublayer : Channel allocation, ALOHA(pure and slotted), Carrier sense multiple access (CSMA), CSMA/CD, Ethernet , Manchester Encoding, Wireless LANs, Bridges , Switches,

UNIT 3: *Network Layer:*

Host-to-Host Delivery: Internetworking, Addressing and Routing, Network Layer Protocols : ARP, IPv4, ICMP, IPv6, Unicast and Multicast Routing : Routing Protocols.

UNIT 4: *Transport Layer:*

Process-to-Process Delivery : UDP and TCP, Congestion Control and Quality of Service.

UNIT 5: *Application Layer:*

Client-Server Model : Socket Interface, Domain Name System (DNS), Electronic Mail (SMTP), and File Transfer (FTP), HTTP and WWW, Multimedia.

Text Book:

1. Forouzan B, ;Data Communications and Networking , 2nd Edition, Tata McGraw-Hill, New Delhi, India 2006

Reference Books:

1. Stallings W.;Data and Computer Communications, 7th Edition, Prentice Hall India, New Delhi – 2007
2. P.C. Gupta- Data Communications and Computer Networks, PHI, New Delhi, 2006.
3. Tanenbaum : Computer networks
4. R. Stevens: TCP/IP Illustrated volume.1
5. Beej Guide : Socket Programming.

COMPUTER ALGORITHM LAB
(MCA P4005)

Experiment problems of the Paper MCA C4001

ELECTIVE LAB
(MCA P4006)

Experiment problems as per Elective I

OPTIMIZATION TECHNIQUES

(MAT C5001)

UNIT 1: Operation Research – An overview, Organ and Development of OR, Nature and Features of OR, Modeling in OR, General Solution Methods for OR models, Scientific method in OR, Methodology of OR, Application, Opportunities and Shortcomings of OR.

Linear Programming Problem : Introduction, Mathematical Formulation of the Problem, Graphical Solution Method, Some Exceptional Cases, General LPP, Canonical and Standard forms of LPP, Simplex Method: Introduction, Fundamental properties of solutions, the Computational Procedure, Use of Artificial variables, Solution to simulation Linear Equations, Investing a Matrix using Simplex Method.

UNIT 2: Duality in LPP: Introduction, General Primal – Dual pair, Formulating a Dual Problem, Primal Dual pair in Matrix form, Duality theorems, Dual simplex method, Post optimal Analysis, Introduction: Variation in cost vector, Requirement Vector, Coefficient Matrix, Structural Variation.

UNIT 3: Integer Programming: Introduction, Gomory Method, Construction of Gomory's constraints, Fractional Cut Method: All Integer & Mixed Integer, Revised Simplex Method, Bounded Variable, Parametric LPP, Karmarkar Algorithm.

UNIT 4: Dynamic Programming & Introduction: Characteristic of Dynamic Programming, Dynamic Programming Algorithm, Solution of LPP by Dynamic Programming.

UNIT 5: Transportation Problem: Introduction, Mathematical Model of Transportation Problem, The Transportation Algorithm, Methods for Finding Initial Solution.

Assignment Problem: Introduction, Mathematical Model of Assignment Problem, Solution Methods of Assignment Problem.

Text Book:

1. Kanti Swarup, P.K. Gupta, Man Mohan – "Operations Research, Sultan Chand & Sons, New Delhi – 2001

Reference Books:

1. Ronald L. Rardin "Optimization in Operations Research", Pearson Education, New Delhi – 2003
2. S.S. Rao, "Optimization Theory & Application", Wiley Eastern Ltd, 1979.
3. Operations Research – J. K. Sharma

DATA WAREHOUSING AND DATA MINING

(MCA C5002)

UNIT 1: Data warehousing: Introduction to data warehousing, Why a Data Warehouse, Evolution of decision support systems, Granularity in the data warehouse, Data warehouse life cycle, Building a data warehouse, Data Warehousing Components, Data Warehousing Architecture, Data Warehouse Implementation, OLAP Operation, OLAP Engine, Multidimensional versus Multi relational OLAP, Multidimensional Data Model, Data warehouse Metadata, Data warehouse Backend Process, Extract Transform Load(ETL) and Data Quality Management(DQM) Concepts, OLTP Operations.

UNIT 2: Data Mining Introduction to Data Mining, Data Mining Applications, Data Mining Functions, Steps In Data Mining Process, Classification of Data Mining System, Overview of Data Mining Techniques, Architecture of Data Mining Systems, Steps in Data Preprocessing - Data Cleaning, Data Integration, Data Transformation and Data Reduction, Data Mining Primitives, DMQL, KDD Vs. DM, DBMS Vs. DM, DM Technique, Issues and challenges in Data Mining, From Data warehousing(OLAP) to Data Mining(OLAM), WWW Mining, Temporal Mining, Spatial Data Mining, Multimedia Mining, Text Mining

UNIT 3: Mining Association Rule in Large Database: Introduction, Association Rule Mining, Market Basket Analysis: A Motivating example for Association Rule Mining, Basic Concepts, Mining single-dimensional Association Rules from Transactional Databases, Multi Dimensional Association Rules from Relational Databases, Generating Association Rules from Frequent Itemsets, Iceberg Queries,

UNIT 4: Classification and Prediction : Meaning of Classification and Prediction, Basic Concepts, Issues Regarding Classification and Prediction, Introduction to Decision Tree, Classification by decision Tree Induction, , Bayesian Classification, Classification by Back propagation, Classification based on Association Rule, Other Classification methods, Classification Accuracy.

UNIT 5: Clustering Techniques: Clustering, Clustering Paradigms, Requirement of Clustering in Data Mining, Hierarchical cluster and Partitioning Cluster, Clustering Methods(Partitioning Method, Hierarchical Method, Density-based Method, Grid-Based Method, Model-Based Method, Constraint-based Method), Trends in Data Mining, Applications of Clustering

Text Book:

1. A.K. Pujari, "A Data Mining Technique", University press (India) Limited, 2001

Reference Books:

1. A Hand and M. Kamber, "Data Mining Concept and Technique", Morgan. Kauffmann Publishers, Else river India, New Delhi, 2003.
2. Recherd J, Roiger and Michance W. Creutz, Data Mining: a tutorial Based Primer, Addison Wesley, 2003.
3. M.H. Dienham, Data Mining : Introductory and Advanced Topics, Pentice Hall 2003.
4. Database Management Systems (DBMS) by Icon Group International .
5. Database Systems Concepts "KORTH".

COMPUTER GRAPHICS

(MCA C5003)

UNIT 1: Introduction to Computer Graphics and Databases in VB. NET

What is Computer Graphics?, Application of Computer Graphics, Presentation Graphics Painting and Drawing, Photo Editing, scientific Visualization, Image Processing, Digital Art, Education, training, Entertainment and CAD,S Simulation, Animation and Games. Input and Output Devices, Touch Pane, Light Pens, Graphic Tablets, Plotters, Film Recorders, Display Devices, Refreshing Display Devices, Raster-Scan, Random-Scan, Plasma Panel and LCD panels.

UNIT 2: Graphics Primitives

Points and Lines, Line-drawing Algorithms, DDA algorithm, Bresenham's line Algorithm, Circle-generating algorithm, Properties of Circles, Midpoint Circle of Algorithm, Polygon Filling Algorithm : Scan-Line.

2-D Viewing and Clipping and 2-D and 3-D Transformations

Point Clipping, Line Clipping, Cohen-Sutherland Line Clippings, Cyrus-Beck Line Clipping Algorithm, Polygon Clipping: Sutherland Hodgman Algorithm, Windowing Transformation Basic Transformations, Translation, Rotation, Scaling, Shear, Composite Transformations, Rotations about a point, Reflection about a line, Homogeneous Coordinate Systems, 3-D Transformations, Viewing Transformation.

UNIT 3: Projections and Modeling & Rendering Curves and Surfaces

Parallel Projection, Orthographic & Oblique Projections Isometric Projections, Perspective Projections. Polygon Representation Methods, Polygon Surfaces, Polygon Tables, Plane Equations, Polygon Meshes, Bezier Curves and Surfaces, Bezier Curves, Properties of Bezier Curves, Bezier Surfaces, Surface of Revolution, Visible - Surface Detection, Depth Buffer Method, Scan-Line Method, Area-Subdivision Method.

UNIT 4: Polygon Rendering and Ray Tracing Methods

Illumination Model, Ambient Reflection, Diffuse Reflection, Specular Reflection, Shading, Gouraud Shading, Phong Shading, Ray Tracing, Basic Ray-Tracing Algorithm.

UNIT 5: Multimedia and Animation

Basic of Animation, Types of Animation, Simulating Acceleration, Computer Animation Tools, Applications, Multimedia Concepts and Applications, Concepts of Hypertext/Hypermedia, Multimedia Applications, Education, Video Conferencing, Training, Entertainment, Electronic Encyclopedia.

Text Book:

1. Computer Graphics by Amarendra Nath Sinha, *Landmark Ltd.*

Reference Books:

2. Basics of Computer Graphics Design by Niit, *Landmark Ltd.*
3. Procedural Elements for Computer Graphics by Rogers, David F., *Landmark Ltd.*
4. Introduction To Computer Graphics by Krishnamurthy, N, *Manohar Publishers And Distributors*
5. Principles Of Interactive Computer Graphics by Newman, William M., *Landmark Ltd.*
6. Computer Graphics by G.S. Baluja.

CYBER LAWS AND INFORMATION SECURITY

(MCA C5004)

UNIT 1: Object and Scope of the IT Act

Genesis, Object, Scope of the Act **E-Governance and IT Act 2000** Legal recognition of electronic records, Legal recognition of digital signature, Use of electronic records and digital signatures in Government and its agencies

UNIT 2: Encryption

Symmetric Cryptography, Asymmetric Cryptography, RSA Algorithm, Public Key Encryption **Digital Signature** Technology behind Digital Signature, Creating a Digital Signature, Verifying a Digital Signature, Digital Signature and PKI, Digital Signature and the Law

UNIT 3: Need of Certifying Authority and Power, Appointment, function of Controller, Who can be a Certifying Authority?, Digital Signature Certifications, Generation, Suspension and Revocation Of Digital Signature Certificate

UNIT 4: Domain Name Disputes and Trademark Law

Concept of Domain Names, New Concepts in Trademark Jurisprudence, Cyber squatting, Reverse Hijacking, Meta tags, Framing, Spamming, Jurisdiction in Trademark Dispute

UNIT 5: Cyber Regulations Appellate Tribunal

Establishment & Composition Of Appellate Tribunal, Powers of Adjudicating officer to Award Compensation, Powers of Adjudicating officer to Impose Penalty

The Cyber Crimes

Tampering with Computer Source Documents, Hacking with Computer System, Publishing of Information Which is Obscene in Electronic Form, Offences: Breach of Confidentiality & Privacy, Offences : Related to Digital Signature Certificate

Text Book:

1. Cyber Law in India by Farooq Ahmad – Pioneer Books

Reference Books:

1. Information Technology Law and Practice by Vakul Sharma – Universal Law Publishing Co. Pvt. Ltd.
2. The Indian Cyber Law by Suresh T Vishwanathan – Bharat Law house New Delhi.
3. Hand book of Cyber & E-commerce Laws by P.M. Bakshi & R.K. Suri – Bharat Law house New Delhi.
4. Guide to Cyber Laws by Rodney D. Ryder – Wadhwa and Company Nagpur.
5. The Information Technology Act, 2000 – Bare Act – Professional Book Publishers – New Delhi.

COMPUTER GRAPHICS LAB
(MCA P5005)

Experiment problems of the Paper MCA C5003

MINI PROJECT

(MCA P5006)

One month Internship & Project Preparation

MAJOR PROJECT

(MCA C6001)

Six months Industrial / Project Training

ELECTIVE – I

ADVANCED JAVA (MCA E4007)

UNIT 1: Components and Facilities or Rich Graphical User Interfaces: Programming with the JFC, Swing API Components, component Class, Windows, Dialog Boxes, and Panels, Labels, Buttons, and Check Boxes, Menus, Toolbars, and Actions, Sliders, Spinners, Progress Bars, and Scrollbars, Lists and Combo Boxes, Text-Entry Components, Color and File Choosers, Tables and Trees, Printing with the 2D API, Java Print Service API.

UNIT 2: Using Relational Database: Introduction, Best Practices for Programming for Databases, JDBC Drivers for RDBM Systems, SQL to Java Type Mappings, Understanding the Database used in this chapter, Using the **java.sql** API, Coding Transactions, Using the **javax.sql** API, Connection Pooling.

UNIT 3: XML: Introduction, XML Structure, XML Example Document with SAX, Parsing an XML Document with DOM, Generating an XML Document with DOM, Validating XML Documents using DTD and XML Schema, Transforming XML using XSLT. Working with URLs, Working with Sockets, Remote Method Invocation.

UNIT 4: Building Web Applications: Introduction, The Technology of the Web, J2EE Web Application Packaging, Servlets, The Servlet API, The User Experience, Building a Web App with Continuity, Java Server Pages, JSP Tags and API, How the Server Processes JSPs, Java Coding in JSPs, Frameworks for Building Web Applications, Building Robust WebApps.

UNIT 5: Enterprise JavaBeans: Introduction, Enterprise Programming, What are EJBs? Session EJBs, EJB Clients, Entity EJBs, Message-Driven Beans, EJB Transactional Characteristics, EJB Security, Best Practices for Designing EJB-Based Applications.

Text Book:

1. Wigglesworth & McMillan – Java™ Programming Advanced Topics, 3rd Edn., India Edition, Thomson Education, New Delhi, 2007

Reference Books:

1. Core Java Volume-I, Horstman and Cornell, Pearson Education
2. Core Java Volume-II, Horstman and Cornell, Pearson Education
3. Inside Servlets – Dustin R. Callway- Pearson Education
4. Developing Java Servlets – James Goodwill. Techmedia.
5. Headfirst jsp and servlet-kaithy sieera.

ELECTIVE – I

DOT NET (MCA E4008)

UNIT 1: Essential Visual Basic.NET: The .NET Framework and the Common Language Runtime, Building the VB.NET Applications, The Visual Basic Integrated Development Environment. **The Visual Basic Language: Operators, Conditionals and Loops:** The Visual basic Keywords, Visual Basic Statement, All about statement syntax, The Options and Import Statements.

UNIT 2:.NET Assemblies.: .NET Assemblies, Shared Assemblies, Side-By-Side execution of two versions of Shared Object, Benefits of Assemblies over Predecessors, Private Assemblies

UNIT 3: Web Forms: Working with Web Forms, Working with Web Form Controls, Saving a Web Application's State, Web Forms and HTML, Creating a Web Application, Adding Controls to a Web Form, Running a Web Application, Using the HTML Editor to Customize Web Pages, Creating a Multiform Web Project, Handling a Client Even

UNIT 4: Web Forms: Buttons, Text Boxes, Labels, Literals and Place Holders: The Control Class, The WebControl Class, Creating Buttons, Creating Text Boxes, Creating Labels, Creating Literals, Creating Place Holders

Web Forms: Checkboxes, Radio Buttons, Tables and Panels: Checkboxes, Checkboxes Lists, Radio Buttons, Radio Buttons Lists, tables , Panels

UNIT 5: HTML Controls: Client and Server HTML Controls, HTML Server Control Classes, The Html Control Class, Working with HTML Client Controls, Working with HTML Server Controls. Database Access in Web Applications.

Text Book:

1. Steven Holzner, Visual Basic.NET Programming Black Book, 5TH Ed. (2007), Dreamtech Publication.

Reference Books:

1. Dinesh Maidasani, VB.net, Firewall Media Publication, 2007.

ELECTIVE-I

PHP (MCA E4009)

UNIT 1: Introduction to the Web: Web Browser, Web Server, XAMPP, Web Development Cycle Web publishing, Static Web contents, Dynamic Web contents Introduction to HTML HTML fundamentals, HTML Tags, Elements and Attributes Structure of HTML code, Lists Block Level tags Block formatting, Heading, Paragraph, Comments, Text alignments and Font size. Text Level tags Bold Italic, Underlined, Strikethrough, Superscript, Subscript

UNIT 2: HTML: Inserting graphics, Linking and Scaling images. Table, Frameset, Forms .Cascading Style Sheets The usefulness of Style Sheets, Creating Style sheets, Classes and Pseudo Classes, CSS Tags.

UNIT 3: PHP Essentials: Installation and Configuration files Variables, constants, Operators, Control Structures, PHP Strings, Array , PHP Functions , Built-in PHP Function Libraries,

UNIT 4: Forms , PHP Data Validation, File Handling (Including and Requiring Files, Reading and Writing Files, Allowing Users to Download Files)

UNIT 5: MYSQL Introduction about Database: Data Types, DML, DDL, Aggregate functions Data Time functions . PHP ODBC, Sessions, Cookies, FTP, GET and POST data, HTTP Headers, HTTP Authentication . PHP GET and POST data, HTTP Headers, HTTP Authentication

Text Books:

1. Textbook of Web Design – Joel Sklar, Cengage Learning

Reference Books:

1. HTML: The Complete Reference – Thomas A. Powel
2. Web Technologies – Uttam K. Roy, Oxford
3. Head First PHP and MySQL- O'Reilly Publication
4. PHP: The Complete Reference – Steven Holzner
5. PHP and MySQL Web Development (3rd Edition)- Luke Welling, Laura Thomson
6. Developing Web Applications, Ralph Moseley, WSEwiley
8. PHP for the Web: Visual QuickStart Guide, 4/e - Larry Ullman, Pearson

ELECTIVE – II

WIRELESS COMMUNICATIONS (MCA E5007)

UNIT 1: Introduction to Wireless Communication Systems – evolution of mobile radio communications, mobile radio systems around the world, radio communication systems – paging systems, cordless telephone systems, cellular telephone systems; comparison of common wireless communications, trends in cellular radio and personal communication, second generation (2G) cellular networks, third generation (3G) wireless networks, introduction to radio wave propagation, free space propagation model.

UNIT 2: Basics of mobile communication – Limitations of conventional mobile system, mobile cellular communication – introduction, concept of frequency reuse, cluster size, cellular system architecture – mobile station, base station, MSC, channel assignment strategies, call handover strategies, interference and system capacity, improving capacity in cellular systems – cell splitting, sectoring, repeaters, microcell zone concept.

UNIT 3: Global system for mobile communication – GSM services and features, system architecture, GSM radio subsystem, GSM channel types, location updating and call setup, introduction to CDMA digital cellular standard, comparison between GSM and CDMA.

UNIT 4: Wireless networking – wireless local area network standards, technology – RF and IR wireless LAN, diffuse, quasi-diffuse and point-to-point IR wireless LAN, advantages and applications of Wireless LAN,

UNIT 5: Introduction to WI-FI, Bluetooth, 3G and 4G wireless systems.

Text Book:

1. Wireless communications, Principles and practice (Second Ed.) T. S. Rappaport, Prentice Hall.

Reference Books:

1. Wireless communications and networking, J. W. Mark and W. Zhuang, Prentice Hall.
2. Wireless communications and Networks (Second Ed.), W. Stallings, Prentice Hall 2005.
3. Wireless communications, A .F. molisch, wiley - IEEE Press,2007
4. Fundamentals of Wireless Communications–D.Tse,P.Viswanath,Cambridge University Press 2005

ELECTIVE – II

TESTING METHODOLOGIES

(MCA E5008)

UNIT 1: Fundamentals of Testing

Human and errors, Defect, Fault, Failure, bug, Testing objectives, Responsibilities of Tester, Characteristics of tester, Test team hierarchy, Scope of Testing, When Should Testing Occur, Testing Constraints, Life Cycle of Testing, Independent Testing , Quality Assurance versus Quality Control, The Cost of Quality, Software Quality Factors, How Quality is Defined, Requirement Behavior and Correctness, Fundamentals of Test Process, Psychology of Testing, General Principles of Testing, Test Metrics.

UNIT 2: Role of Testing in SDLC

SDLC Overview, Phases in SDLC, Popular SDLC Models(Waterfall Models, Spiral Model, RAD Model, V Model, Incremental Model, Prototype Model), Agile Methodology and Its Impact on testing, Structural versus Functional Technique, Verification versus Validation, Static versus Dynamic Testing, Examples of Specific Testing Techniques, Object oriented testing

UNIT 3: Test Case design

Test case, Test case Template, Test management, Test scenarios, Test strategy, Cause and Effect graph testing technique, Boundary value analysis and Equivalence Class Partitioning, Types of Coverage, Statement Coverage, Decision Coverage, Condition Coverage, Verification and Validation, Decision Table, Test Planning, Test Planning Template, Bug defect, Bug tracking tools, Bug life cycle

UNIT 4: Approaches to Testing – Static Testing

Test design techniques, static test technique, Formal review, Informal Review, Types of Reviews, Walkthrough, Technical Review, Inspection, static analysis tools.

Dynamic Testing:

Black Box Testing and White Box Testing

UNIT 5: Test Management & Strategies-

Test Policy, Test Strategy, Test Planning, Test Plan components, Test Plan Attachments, Test managements, Test process, Reporting Test Results, Test Control, Configuration Management, Entry and Exit Criteria, Estimating Techniques, Test Monitoring ,Test teams, Tasks and Qualifications, Quality Assurance Plan, Prioritization Plan. Test Activity Management, Incident Management, Configuration Management

Text Book:

1. Software Testing Foundations, Andreas Spillner, Tilo Linz, Hans Schaefer, Shoff Publishers and Distributors.

Reference Books:

1. Software Testing: Principles and Practices by Srinivasan D and Gopalswamy R, PearsonEd, 2006.
2. Foundations of Software Testing by Aditya P. Mathur – Pearson Education custom edition 2000.
3. Testing Object Oriented Systems: models, patterns and tools, Robert V Binder, Addison Wesley, 1996.

ELECTIVE – II
ARTIFICIAL INTELIGENCE
(MCA E5009)

Unit 1: Intelligent Agents: Agents & Environment, Nature Of Environment, Structure Of Agents, Goal Based Agents, Utility Based Agents, Learning Agents.

Unit 2: Problem Solving : Problems, Problem Space & Search: Defining The Problem As State Space Search, Production System, Problem Characteristics, Issues In The Design of Search Programs.

Unit 3: Search Techniques: Solving Problems By Searching, Problem Solving Agents, Searching For Solutions; Uniform Search Strategies: Breadth First Search, Depth First Search, Depth Limited Search, Bidirectional Search, Comparing Uniform Search Strategies.

Unit 4: Heuristic Search Strategies: Greedy Best-First Search, A* Search, Memory Bounded Heuristic Search: Local Search Algorithms & Optimization Problems: Hill Climbing Search, Simulated Annealing Search, Local Beam Search, Genetic Algorithms; Constraint Satisfaction Problems, Local Search For Constraint Satisfaction Problems.

Unit 5: Adversarial Search : Games, Optimal Decisions & Strategies In Games, The Minmax Search Procedure, Alpha-Beta Pruning, Additional Refinements, Iterative Deepening.

Unit 6: Knowledge & Reasoning : Knowledge Representation Issues, Representation & Mapping, Approaches To Knowledge Representation, Issues In Knowledge Representation.

Unit 7: Representing Knowledge Using Rules : Procedural Verses Declarative Knowledge, Logic Programming, Forward Verses Backward Reasoning, Matching, Control Knowledge.

Text Book:

1. Ritch & Knight -Artificial Intelligence, TMH

Reference Books:

1. S. Russel and P. Norvig- Artificial Intelligence A Modern Approach, Pearson Education.
2. Patterson -Introduction to Artificial Intelligence & Expert Systems, PHI