STRUCTURE

FOR

MCA PROGRAMME
UNDER FACULTY OF ENGINEERING

EFFECTIVE FROM JUNE 2008
# COURSE STRUCTURE FOR M.CA. (2008 Course) w. e. f. June – 2008

## SEMESTER I

<table>
<thead>
<tr>
<th>CODE</th>
<th>SUBJECT</th>
<th>TEACHING SCHEME</th>
<th>EXAMINATION SCHEME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lect.</td>
<td>Pr.</td>
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<td></td>
<td></td>
<td>Int</td>
<td>Ext</td>
</tr>
<tr>
<td>510901</td>
<td>Problem Solving &amp; Programming in C</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>510902</td>
<td>Discrete Mathematics</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>510903</td>
<td>Foundations of Information Technology</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>510904</td>
<td>Probability &amp; Statistics</td>
<td>4</td>
<td>--</td>
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<tr>
<td>511905</td>
<td>Management Science</td>
<td>4</td>
<td>--</td>
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<tr>
<td>510906</td>
<td>Programming Laboratory</td>
<td>--</td>
<td>4</td>
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<tr>
<td>510907</td>
<td>Information Technology Laboratory</td>
<td>--</td>
<td>4</td>
</tr>
<tr>
<td>510908</td>
<td>Soft Skills</td>
<td>--</td>
<td>2</td>
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<tr>
<td></td>
<td><strong>Total of First Term</strong></td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

Term work will be assessed continuously during the semester internally by a pair of examiners appointed by the Head of the Institution. Practical/Oral examination will be conducted at the end of semester by a pair of examiners with one internal and one external examiner appointed by the University.

## SEMESTER II

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<tr>
<td></td>
<td></td>
<td>Int</td>
<td>Ext</td>
</tr>
<tr>
<td>510909</td>
<td>Object-Oriented Programming</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>510910</td>
<td>Data Structures and Files</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>510911</td>
<td>Operations Research</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>510912</td>
<td>Microprocessor Applications</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>510913</td>
<td>Management Information Systems</td>
<td>4</td>
<td>--</td>
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<tr>
<td>510914</td>
<td>Data Structures Laboratory</td>
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<td>4</td>
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<tr>
<td>510915</td>
<td>Object Oriented Programming Laboratory</td>
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<td>4</td>
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<tr>
<td>510916</td>
<td>Microprocessor Laboratory</td>
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<tr>
<td></td>
<td><strong>Total of First Term</strong></td>
<td>20</td>
<td>10</td>
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### SEMESTER III

<table>
<thead>
<tr>
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<th>EXAMINATION SCHEME</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Lect. Pr. Paper TW Oral Pr Total</td>
<td>Int Ext Int Ext Ext</td>
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<tr>
<td>610901</td>
<td>Operating Systems</td>
<td>4 -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 100</td>
<td></td>
</tr>
<tr>
<td>610902</td>
<td>Databases: Concepts &amp; Systems</td>
<td>4 -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 100</td>
<td></td>
</tr>
<tr>
<td>610903</td>
<td>Financial Accounting &amp; Management</td>
<td>4 -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 100</td>
<td></td>
</tr>
<tr>
<td>610904</td>
<td>Computer Communications &amp; Networks</td>
<td>4 -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 100</td>
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</tr>
<tr>
<td>611905</td>
<td>Principles of Multimedia</td>
<td>4 -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 100</td>
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<tr>
<td>610906</td>
<td>Software Laboratory I</td>
<td>-- 2# 30 70 -- -- 30 70 -- -- 30 70 -- -- 50 50 -- -- 100</td>
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</tr>
<tr>
<td>610907</td>
<td>Database Laboratory</td>
<td>-- 2# 30 70 -- -- 30 70 -- -- 30 70 -- -- 50 50 -- -- 100</td>
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</table>

*Each student will select a topic in the area of Computer Engg./Technology preferably keeping track with recent technological trends and development. The topic must be selected in consultation with the institute guide. Each student will make a seminar presentation in the term making use of audio/visual aids for a duration of 20 – 25 minutes and submit two copies of the seminar report in a prescribed format provided by the host institution duly signed by the guide and Head of the department. Attendance for all seminars for all students is compulsory. Staff members of the institute will assess the seminar internally.

### SEMESTER IV

<table>
<thead>
<tr>
<th>CODE</th>
<th>SUBJECT</th>
<th>TEACHING SCHEME</th>
<th>EXAMINATION SCHEME</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Lect. Pr. Paper TW Oral Pr Total</td>
<td>Int Ext Int Ext Ext</td>
</tr>
<tr>
<td>610909</td>
<td>System Analysis and Design</td>
<td>4 -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 100</td>
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<tr>
<td>610910</td>
<td>Web Technology</td>
<td>4 -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 100</td>
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<tr>
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<td>Object Oriented Analysis &amp; Design</td>
<td>4 -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 100</td>
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<tr>
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<td>Java</td>
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<tr>
<td>610913</td>
<td>Elective I</td>
<td>4 -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 30 70 -- -- 100</td>
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<tr>
<td>610914</td>
<td>Web Programming Laboratory</td>
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<tr>
<td>610915</td>
<td>Software Laboratory II</td>
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<tr>
<td>610916</td>
<td>Mini Project**</td>
<td>-- 2# 30 70 -- -- 30 70 -- -- 30 70 -- -- 50 50 -- -- 100</td>
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</table>

* # Hours/per/week/Student  
  ** Mini Project is to be carried out in a group of 4 students. Each group will be assigned a guide. At the end of the term the students should submit 2 copies of the report in a prescribed format provided by the institute duly signed by the guide and Head of the Department. Staff members of the institute will assess the mini project internally.*
### SEMESTER V

<table>
<thead>
<tr>
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<tr>
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<td>Int</td>
<td>Ext</td>
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<tr>
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<td>Software Engineering</td>
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<tr>
<td>710902</td>
<td>Software Testing</td>
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<tr>
<td>710903</td>
<td>Advanced Databases</td>
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<tr>
<td>710904</td>
<td>Principles &amp; Practices of IT Management</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>711905</td>
<td>Elective II</td>
<td>4</td>
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<tr>
<td>710906</td>
<td>Computer Laboratory</td>
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<td>4</td>
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<tr>
<td>710907</td>
<td>Elective Laboratory</td>
<td>--</td>
<td>2</td>
</tr>
<tr>
<td>710908</td>
<td>Survey &amp; Case Study'</td>
<td>--</td>
<td>2</td>
</tr>
</tbody>
</table>

Total of First Term

|                  | 20 | 08 | 150 | 350 | 100 | 50 | 50 | 700 |

1) Students should submit the report of the Survey/Case Study in the format prescribed by the host institution and will be duly signed by the guide and the Head of the Department. The term will be granted only after submission of the report.

### SEMESTER VI

<table>
<thead>
<tr>
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<td></td>
<td></td>
<td>Lect</td>
<td>Pr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Int</td>
<td>Ext</td>
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<tr>
<td>710909</td>
<td>Comprehensive Viva</td>
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<tr>
<td>710910</td>
<td>Project Work</td>
<td>---</td>
<td>20**</td>
</tr>
</tbody>
</table>

Total of First Term

|                  | 24 | 250 | 250 | 400 |

* Hours/per Week/student (Self Study Only)

Comprehensive Viva will be based on questions from any of the subjects taught during semester I to Semester V by a panel consisting of 2-3 examiners with at least one external examiner from industry/academics. 5-6 panels may be formed. Viva will be conducted during 7th to 10th week from the commencement of 6th semester.

** Hours/per/week/Student (For calculating workload: 6 Hrs/week/student)

Project work is to be carried out either individually or in a group. Each group will be assigned a guide. At the end of the term the students should submit at least 2 copies of the project report in a prescribed format. Examination will be carried out by a pair of examiners for each group with one internal and one external examiner appointed by the University.

**Elective I**
- Distributed Systems
- Human Computer Interface
- ERP
- IT Infrastructure management

**Elective II**
- Software Architecture
- Artificial Intelligence & Neural Networks
- Unix
- Design & Analysis of Algorithms
It is resolved to recommend to the Faculty of Engineering to accept the structure, rules and regulations and detailed syllabus for the First year of the Masters in Computer Application (MCA) under faculty of Engineering.

University of Pune  
MCA (Under Faculty of Engineering) 2008 Syllabus  
Rules, Regulation and General Information

| MCA (Part I) | From Academic Year 2008 – 2009 |
| MCA (Part II) | From Academic Year 2009 – 2010 |
| MCA (Part III) | From Academic Year 2010 – 2011 |

1. The name of the programme shall be Master of Computer Applications (MCA). It is a three-year (six semester) full-time programme.

2. Eligibility for Admission: The eligibility criteria for admission for MCA course will be decided by the Competent authority (Director, Technical Education – Govt. of Maharashtra and/or the AICTE, New Delhi).

3. The details of semester wise number of theory subjects and laboratory subjects, number of hours, minimum and maximum marks for each head of passing are provided in the structure of the programme. Lectures and practical should be conducted as per the scheme of lectures and practical. Specific instructions are provided for some of the subjects such as ‘Seminar’, ‘Mini-project’, ‘Survey & Case studies’, ‘Project-work’ and ‘Comprehensive Viva-voce’ also.

4. A Candidate to be eligible for the Degree of MCA will be required to appear for and pass examination as under:

<table>
<thead>
<tr>
<th>Examination</th>
<th>Consisting of</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Examination in MCA (F.Y.)</td>
<td>Part I and Part II</td>
</tr>
<tr>
<td>Second Year Examination in MCA (S.Y.)</td>
<td>Part I and Part II</td>
</tr>
<tr>
<td>Third Year Examination in MCA (T.Y.)</td>
<td>Part I and Part II</td>
</tr>
</tbody>
</table>

No candidate will be permitted to appear for Part I or Part II Examination unless he/she keeps term for that part at a College Affiliated to the University with:

- 75 % Attendance in each head of passing of theory and/or term work or practical as prescribed by the University.
- Satisfactory completion of the term work prescribed for the Part and passing in the term work by securing at least 40 % marks out of the maximum marks prescribed for each term work. The term work shall be assessed internally at F.Y., & S.Y. Term work at T.Y. will be assessed externally. Also the candidate must secure 40% of maximum marks for internal assessment for each Theory head for the Part.
Grant of Term

- A candidate who is granted term for F.Y. Part I will be allowed to keep term for his/her F.Y. Part II Examination even if he/she appears and fails or does not appear at F.Y. Part I Examination.
- A candidate who is granted term for S.Y. Part I will be allowed to keep term for his/her S.Y Part II Examination even if he/she appears and fails or does not appear at S.Y. Part I Examination.
- A candidate who is granted term for T.Y. Part I will be allowed to keep term for his/her T.Y. Part II Examination even if he/she appears and fails or does not appear at T.Y. Part I Examination.

5. Evaluation and Examinations

At each part examination,

- Paper
- Practical
- Oral
- Term Work

as prescribed in the subjects, shall each constitute a separate head of passing.

The total assessment of the candidate for Theory heads is made in terms of an internal assessment and an external assessment for each Theory course.

For each theory head, 30 marks will be based on internal assessment and 70 marks on external assessment (semester examination). The internal assessment of 30 marks will be based on Class Test (15 marks), quiz, home assignments (10 Marks) and attendance (5 Marks). The internal marks will be communicated to the University at the end of each semester. These marks will be considered for declaration of the results.

For each theory head, Theory examination of 70 marks will be conducted by the University at the end of the semester.

6. In respect of Term Work evaluation at F.Y. and S.Y., target date shall be fixed for the completion of each sheet, job, project, experiment or assignment, as prescribed in the syllabus and the same shall be collected on the target date and assess immediately at an affiliated college by at least one pair of the concerned teachers for the subject appointed by Principal and the marks shall be submitted at the end of each term to Principal of the College. The Principal of the College shall communicate to the University after the end of the each term, the term work marks along with examination seat numbers and names of candidates, duly signed by concerned teaches and countersigned by the concerned Head of Institution. The term work at T.Y. will be assessed externally by a pair of examiners (one internal and one external) appointed by the University.
7. Term work and performance of Practical /Oral Examination shall be assessed on the basis of depth of understanding of principles involved and not on the basis of mere correctness of results or ornamental or color presentation.

8. Every candidate must secure 40% of maximum marks in internal as well as 40% maximum marks in external for each theory head of passing. For each of the term work, Practical and Oral heads the candidate must secure 40% of maximum marks.

9. The class should be awarded to the student on the aggregate marks obtained by him. The award of class shall be as follows:

   (A) Aggregate 66 % or more marks ...... First class with Distinction  
   (B) Aggregate 60 % or more marks      ...... First class  
      But less than 66 %  
   (C) Aggregate 55 % or more marks  ...... Higher Second Class  
      But less than 60 %  
   (D) Aggregate 50 % or more marks  ...... Second Class  
      But less than 55 %  
   (E) Aggregate 40 % or more  ...... Pass Class  
      But less than 50 %

10. In case a candidate fails in an examination but desires to appear again thereat,

   • He/She may at his/her option claim exemption from appearing in the head/s of passing in which he/she has passed.  
   • Such exemption, if claimed, shall cover all the heads of passing in which it can be claimed.  
   • The marks obtained by the candidate in the heads of passing in which he/she claimed exemptions, will be carried over for the subsequent examination.  
   • Such exemption, if not availed of at the immediately subsequent appearance of the candidate at the examination shall deemed to have lapsed.  
   • The marks obtained by the candidate for term work, which is separately assessed, will be carried over unless he/she presents fresh term work after rejoining an affiliated college as a regular student in the corresponding part course.

11. The mark sheet issued to each candidate shall indicate aggregate marks of the highest scorer and number of candidates appeared at the Annual/Summer examination.

12. Backlog:

   • A student shall be allowed to keep term for the S. Y. course if he/ she has a backlog of not more than 6 Heads of passing in Theory Examination and not more than 3 Heads of passing in practical Examination and or oral examination at F.Y.  
   • A student shall be allowed to keep term for the T.Y. course if he/she has no backlog of F.Y. and. if he/ she has a backlog of not more than 6 Heads of passing
in Theory Examination and not more than 3 Heads of passing in practical Examination and or oral examination at S.Y.

13. Board of Paper setters/Examiners: For each semester and examination there will be one board of paper setters and examiners for every subject.

14. Medium of Instruction: The medium of instruction will be English.

15. Clarification of Syllabus: It may be necessary to clarify certain aspects regarding the course. The members of syllabus sub-committee of BOS in Computer Engineering should meet at least once in a year to study and clarify the doubts/difficulties faced by the affiliated institutes.

16. Revision of Syllabus: The syllabus should be revised after every three years.
510901: PROBLEM SOLVING AND PROGRAMMING IN C

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Theory: 70 Marks

Objectives:

1. To develop logical thinking and programming ability.

Unit I
Introduction: (6 Hrs)
Notations of Flow Charts and its implementation, Top-Down-step wise refinement, Implementation of algorithms, Program Verification, Efficiency of algorithms, Analysis of algorithm, Basic Algorithms: Exchange of values of two variables, Summation of set of numbers, Factorial Computation, Sine function computation, Generation of Fibonacci Sequence, Reversing of digits of an integer, Base conversions, Character to Number conversion, Finding Square Root, Factorial, GCD, Generating Prime numbers

Unit II
C Programming Basics: (6 Hrs)
Data Types, Variables, Constants, Expressions, Operators, Operator precedence and associativity, Basic Input-Output statements, Control Structures, Simple Programs in C using all the operators and control structures, Functions: Concept of Functions, Parameters, Parameter passing method, Recursion, local and global variables, scope and extent of variables, Writing programs using recursive and non-recursive functions

Unit III
Arrays and Strings: Single and Multi Dimensional arrays – Strings, String manipulations, Writing C programs using Strings

Unit IV
Pointers: (6 Hrs)
Definition and use of pointers, address operator, pointer variable, pointer arithmetic, arrays of pointers, passing arrays to functions, pointers and functions, constant pointers, pointers to functions.

Dynamic Memory Allocation: Library functions for Dynamic Memory Allocation, Dynamic multi-dimension arrays, Writing C program using Dynamic Memory allocation functions.

Unit V
Structures: (6 Hrs)
Declaring and using Structures, operations on Structures, arrays of structures, user defined data type, nested structures, “sizeof” operator, pointer to structure, Self referencing structures.

Unions: Difference between Unions and structures, operations on a Union, Scope of a union, Bit fields, Writing C programs using structures and unions, Bit-wise and shift operators, command-line arguments, using argc, argv and env variables, Storage classifiers: auto, static, register and external, compiling multi-file programs

Macro Preprocessor: macro definitions, macro with parameters and conditional compiling.
Unit VI           (6 Hrs)
Files: Introduction, File Structure, File handling functions, File types, Error Handling, Low level file I/O, redirection and piping, Writing C Programs using files with high level and low level I/O and BIOS system calls.

Text Books:

1. Dromy R., “How to solve it by computer”, Prentice Hall of India, 81 – 203 – 0388 – 1

REFERENCE:

510902: DISCRETE MATHEMATICS

Teaching Scheme:                                                                 Examination Scheme:
Lectures: 4 Hrs/Week                                                            Theory: 70 Marks

Objectives:
1. To study discrete objects and relationships among them
2. To demonstrate how these concepts can be applied to solve nontrivial real life problems

Unit I (8 Hrs)
Introduction: History of mathematics as related to discrete structure, motivations for discrete structure, Sets: introduction, combination of sets, finite and infinite sets, uncountably infinite sets, mathematical induction, Principle of inclusion/exclusion (addition principle)

Unit II (8 Hrs)
Propositional Calculus: Propositions, logical connectives, truth table, methods of proof using inference rules: equivalence and implications, universal and existential quantifiers, propositional calculus

Unit III (8 Hrs)
Permutations and Combinations: Rules of sum and products, permutations, combinations, generations of permutations and combinations

Unit IV
Relations and Functions: Definitions, properties of binary relation, equivalence relation, partial ordering relations, definition of a function, pigeonhole principle

Unit V (8 Hrs)
Graphs and Planer graphs: Basic terminology, multigraphs and weighted graphs paths and Circuits, shortest path in weighted graphs, Hamiltonian and Eulerian paths and circuits

Unit VI (8 Hrs)
Trees and cut sets: Trees, rooted trees, path lengths in rooted trees, prefix code, binary search trees, spanning trees and cutsets, minimal spanning trees

Text Books:

Reference Books:
510903: FOUNDATIONS OF INFORMATION TECHNOLOGY

Teaching Scheme:                 Examination Scheme:  
Lectures: 3 Hrs/ Week               Theory: 70 Marks

Unit I (8 Hrs)  
**Introduction:** Characteristics of computer, Evolution and generations of computer, Basic Computer Organization: Input and Output Unit, Primary and Secondary storage, CPU: ALU, Control Unit, Classification of computers: Notebook, PCs, Workstations, Mainframe, Super computers, Client and server Number Systems: Binary, Hex, Octal, Decimal numbers, Floating-point Numbers, Computer codes: BCD and EBCDIC codes, ASCII, collating sequence, Boolean Algebra and Logic circuits: Boolean algebra, Boolean functions, logic gates, Logic circuits, Design of combinational logic

Unit II (8 Hrs)  
**Processor and Memory:** study of CPU and different parts of CPU, Memory and types of memory  
**Secondary storage devices:** Sequential and direct access devices, Magnetic tape, disk, Optical disk, Mass storage, Input-output Devices: Study of different Input/Output devices

Unit III (8 Hrs)  
**Computer Software:** What is software? Relationship between Software and Hardware, Types, Logical system architecture, Acquiring software, Software development steps, Firmware, Computer Languages: Analogy with natural language, machine language, Assembly Language, High-Level language, Object Oriented Programming languages, Study of Some Higher level Languages, characteristics of good program, Languages, Selecting language for coding, subprogram

Unit IV (8 Hrs)  
**Operating Systems (OS):** What is an OS? System Performance, Process Management, Memory Management, File management, Security, OS capability enhancement software, some popular OS  
**Application software packages:** Word Processing, Spreadsheets, Graphics, Personal Assistant Package

Unit V (8 Hrs)  
**System Implementation and Operation:** Testing and debugging, Documentation, Changeover to new system, System evolution, System maintenance,  
**Business data processing:** What is data processing? Standard methods of organizing data, File management system, Database management system  
**Multimedia:** What is multimedia? Components of multimedia, Applications

Unit VI (8 Hrs)  
**Data communications and Computer Networks:** Basic elements, Data transmission modes, speed, Transmission media, digital and analog computers, Communication processors, Asynchronous and Synchronous Transmission, Switching techniques, Routing techniques, Network Technologies, network types, Communication Protocols, Internetworking tools, Wireless networks, Distributed computer systems,  
**The Internet:** History, Basic services, www, browsers

Reference Books:  
510904: PROBABILITY AND STATISTICS

Teaching Scheme:
Lectures: 4 Hrs/Week

Objectives:
• To provide an introduction to probability and statistics

UNIT 1: Introduction
Interpretation of probability, sample space and events, permutations and combinations, permutations of indistinguishable objects, Binomial Theorem, Multinomial Theorem, Axioms of probability, conditional probability, Multiplication Rule, Bayes’ Theorem,

UNIT 2: Discrete Distributions

UNIT 3: Continuous Distributions

UNIT 4:
Estimation: Point Estimation, Methods of moments and maximum likelihood estimation, Functions of random Variables -Distribution of sample mean, Internal Estimation, Confidence Interval on the mean with Variance known, Central Limit Theorem.

UNIT 5:
Interval Estimation of Variability, Estimating the Mean and Student-t Distribution, Hypothesis Testing, Significance Testing, Hypothesis and Significance Tests on the Mean.
Inference on proportions: Estimating proportions ,Confidence interval on p, Sample size for estimating p, Testing Hypothesis on a proportion, Comparing two Proportions- Estimation and Hypothesis Testing
UNIT 6:
**Categorical Data:** Multinomial Distribution, Chi-squared Goodness of Fit Tests, Testing for independence: $r \times c$ Test for Independence, Comparing proportions: $r \times c$ Test for homogeneity

**Statistical Quality Control:** Properties of control charts, Shewhart control charts: Sample Mean chart, R chart, P chart, C charts
Acceptance Sampling, Two-Stage acceptance sampling

**Text Books:**


**Reference Books:**

510905: MANAGEMENT SCIENCE

Teaching Scheme:  
Lectures: 4 Hrs / week  

Examination Scheme:  
Theory: 70 Marks

Objectives:  
• To make the student familiar with management concepts

Unit I: Introduction to Management (8 Hrs)  
Evolution of Management Science, Contributions of F.W. Taylor, Henry Fayol, Gantt, Gilbreth etc. Definitions of Management, Management as an art, Science and profession, Management, Administration and Organization concepts, Levels of Management, Functions of Management, Management by Objectives (M.B.O.)

Unit II: Managerial Economics (8 Hrs)  

Unit III: Business Organization (8 Hrs)  
Forms of Business Organization, Definitions, features, advantages, disadvantages of Individual proprietorship, Partnership, Joint stock Companies, co-operatives and Public Sector Undertakings, Types of companies, Formation of Joint stock company, MOA and AOA, Organizational structures, Definition, types, merits and demerits of each of structures (Line, Functional, Line and staff, Committee, Matrix and Project structure)

Unit IV: Human Resource Management (8 Hrs)  
Manpower Planning, Factors affecting Manpower Planning, process of manpower planning, Recruitment, selection, training, Job evaluation, Performance Appraisal, wages and incentives, self and time management  
Communication: elements, process principles, barriers, listening skills, body language, Media of communication, Communication in Organization (vertical, horizontal etc.) Motivation concept and meaning, Maslows Theory of need hierarchy, Mc Gregors Theory X and theory Y

Unit V: Industrial Act (8 Hrs)  

Unit VI: Quality Management (8 Hrs)  
Quality Management: Concept and importance of quality circles and Total Quality Management (TQM), ISO 9000, Patents, Patent procedure  
Note:- Lecturers by experts from industry should be arranged.

Reference Books:  
510906: PROGRAMMING LABORATORY

Teaching Scheme:  
Practical: 4 hours/Week

Examination Scheme:  
Term Work: 50 Marks  
Practical: 50 Marks

Suggested list of assignments

1. Write a program to perform various string operations such as copy, length, reversing, palindrome, concatenation and to find occurrence of a sub-string using and without using library functions
2. Write a program to understand various logical and bit wise operators
3. Write a program to generate permutations and combinations of a given list
4. Write a program to perform various operations such as union and intersection on sets
5. Write a program to perform addition and multiplication operations on matrix. Write functions to determine whether the matrix is symmetric and skewed?
6. Write a program for saddle point or magic square
7. Write a program to compute Inverse of a matrix
8. To create a text file, read it and convert into uppercase and write the contents into another text file by using command line arguments.
9. Write a program to implement a small project to understand the concept of structures, pointers, various operations on files such as create, open, add/modify/delete/process/append a record, search a record, sort, merge, close.

Note:

1. Proper indenting, coding styles, commenting, naming conventions should be followed.
2. Avoid using global variables as far as possible
3. Use of functions is necessary
4. Faculty should prepare a lab manual including standard test cases and should be available to students for reference

Student should submit term work in the form of a journal consisting of minimum 12 assignments based on the above list. Practical examination will be based on the term work. And questions will be asked during the examination to judge the understanding of the practical performed at the time of examination. Candidate is expected to know the theory involved in the experiment.
510907: INFORMATION TECHNOLOGY LABORATORY

Teaching Scheme: Practical: 4 Hrs/ Week
Examination Scheme: Term Work: 50 Marks
Practical: 50 Marks

Assignment No 1:
WINDOWS 98/2000/XP/Linux: Installation, Desktop setting - new folder, rename, recycle bin operations, briefcase function, control panel utility, Network setting, Display properties : Screen saver, background settings, Using Command line utilities of Linux/DOS/Windows etc.

Assignment No 2:
Ms - Word: Create a document such as your resume or notes of any topic of your text book using facilities below
Creating file: save, save as, save as HTML, save as Text, template, RTF format, Page setup utility: Margin settings, paper size setting, paper source, layout, Editing: cut, paste, paste special, undo, redo, find, replace, goto etc, View file: Page layout, Normal outline, master document, ruler, header, footer, footnote, full screen, Insert: break, page number, symbol, date and time, auto text, caption file, object, hyperlink, picture etc. Format: font, paragraph, bullets and numbering, borders and shading, change case, columns, Tools: Spelling, merge documents, protect document, mail merge, macro. Table: Draw label, insert table, cell handling, table auto format, sort formula, Give password to document

Assignment No 3
Ms-PowerPoint: Create any presentation using following facilities
Creating new slide, formatting slide, slide layout, slide show and sorter, Inserting new slide, slide no., date, time, chart, formatting slide, tool operation, Animation, Timing, Inserting Video clips

Assignment No. 4
MS Access: Create a database for Inventory or reservation system or student information system (with multiple tables and relation) and generate different reports
Parts of an Access Window, Tool Bars and Their Icons, Starting Microsoft Access, Creating a New Database, Creating a Database through Table Wizard, Creating a New Table, Rename Columns, Saving the Database, Relationships, Creating Table through Design View, Relationship, Query, Forms, Reports, Import/export tables etc.

Assignment No. 5
Excel Basics: Create small accounting applications such as Maintaining invoices/budgets or totaling of various transactions or Maintaining daily and monthly sales reports or any other application using following facilities of excel
Menus, Opening of Spread Sheet, creation of cells and addressing of cells, Cell inputting, Manipulation of cells, Enter texts numbers and dates, Creation of tables, Cell Height and Widths, Copying of cells, Providing Formulas, Using basic functions/formalism a cell such as Sum, average, Percentage and Other basic functions and draw graphs, import/export

Assignment No. 6
Internet:
A. Creation of New Email Account: Create your own Email account on http://www.hotmail.com / http://yahoo.com or rediff.com and set the account preferences while
registration. Create your signature in hotmail account with following details: 1) Name, 2) Postal Address, 3) Phone, 4) PRN etc.

**B. Email with File Attachment:** Send an email to your hotmail account with sample image file attachment from your hotmail account. Receive this email and confirm signature appended with it.

**C. Outlook Express Exercise:** Add your email (hotmail) account in ‘outlook express’ and explore the settings. Create your signature in ‘outlook express’ with following details: 1) Name, 2) Postal Address, 3) Phone, 4) PRN etc.

**D. MSN Messenger/ Yahoo messenger Exercise:** Add your account in MSN or yahoo Messenger and add the contacts list to your account on messenger.

**E. Search the important information on search engine such as www.google.com/www.altavista.com etc.**

**F: Create a group on Yahoo groups for your class (set properties)**

**G: MS Front Page:** Introduction, Toolbars, Commands and Their Icons, Starting MS Front Page, Creating a Web Page without a Wizard, Creating a Web Page with a Wizard

Student should submit term work in the form of a journal consisting of minimum 12 assignments based on the above list. Practical examination will be based on the term work. And questions will be asked during the examination to judge the understanding of the practical performed at the time of examination. Candidate is expected to know the theory involved in the experiment.
510908: SOFT SKILLS

Teaching Scheme: Practical: 2 Hrs/Week
Examination Scheme: Term Work: 50 Marks

Objectives:

1. To encourage the all round development of students by focusing on soft skills
2. To make the students aware about of the importance, the role and the content of soft skills through instruction, knowledge acquisition, demonstration, and practice
3. To develop and nurture the soft skills of the students through individual and group activities
4. To expose students to right attitudinal aspects and to build the same through activities

The coverage of soft skills that help develop a student as a team member, leader, all round professional in the long run have been identified and listed here for references. As the time allotment for the soft skills laboratory is small and the fact that these skills are nurtured over years, students are encouraged to follow up on these skills as self-study and self driven process.

Unit I (6 Hrs)
Self Development and Assessment: Self-Assessment, Self-Awareness, Perceptions and Attitudes, Values and Belief Systems, Personal Goal Setting, Career Planning, Self-Esteem, Building of Self Confidence

Unit II (6 Hrs)
Verbal and Nonverbal Spoken Communications: Includes planning, preparation, delivery and feedback and assessment of activities like: Public speaking, Group Discussions, Oral Presentation skills, Perfect interview, listening and observation skills, Body Language, Use of presentation graphics, Use of presentation aids, study of Communication Barriers

Unit III (6 Hrs)
Written Communications: Technical Writing – Technical reports, Project Proposals, Brochures, Newsletters, Technical Articles, Technical Manuals, Official / Business Correspondence: Business Letters, Memos, Progress Reports, Minutes of Meeting, Event Reporting, Use of Style, Grammar and Vocabulary for effective Technical writing, Use of Tools, Guidelines for technical Writing, Publishing

Unit IV (6 Hrs)
Ethics and Etiquettes: Business Ethics, Etiquettes in social as well as office settings, E-mail etiquettes, Telephone Etiquettes, Engineering ethics, and ethics as an IT Professional, Civic Sense

Unit V (6 Hrs)
Leadership and Interpersonal Communications: Leaders – their skills, roles, and responsibilities, Vision, Empowering, delegation, motivating others, organizational skills, Problem Solving and conflict management, team building, interpersonal skills. Organizing and conducting meetings, decision making, giving support

Unit VI (6 Hrs)
Other Skills – Managing Time, Meditation, Understanding roles of Engineer’s and their responsibilities, Exposure to work environment and culture in today’s job places, improving
personal memory, Study skills that include Rapid Reading, Notes Taking, Complex problem solving and creativity.

**References for students for self-improvement by self-study**

**Topic 1: Any good book like**

2. Stephen Covey, “7 Habits of highly effective people “

**Topic 2 and 3**

1. John Collin, “Perfect Presentation”, Video Arts MARSHAL.
2. Jenny Rogers, “Effective Interviews”, Video Arts MARSHAL.
7. Management Training and Development Catalog, National Education and Information Films Ltd, Mumbai.

**Topic 4 and 5 and 6**

3. Dr R L Bhatia, “Managing Time for a competitive edge”.
4. Lorayne, Lucas “Memory Book”.

It is proposed that experts from industry be invited to conduct lecturers and workshops to understand the industry soft skill requirements,

**LIST OF POSSIBLE ASSIGNMENTS**

1. Write a Personal essay and or resume or statement of purpose which may include:  
   a. Who am I (family background, past achievements, past activities of significance).  
   b. Strengths and weaknesses (how to tackle them) (SWOT analysis).  
   c. Personal short-term goals, long-term goals and action plan to achieve them.  
   d. Self assessment on soft skills
2. Students could review and present to a group from following ideas:  
   a. Book review.  
   b. Biographical sketch.  
   c. Any topic such as an inspirational story/personal values/beliefs/current topic.  
   d. Ethics and etiquettes and social responsibilities as a professional.
3. Students will present to a group from following ideas:
   b. Public speaking exercise in form of debate or elocution on any topic of choice.

4. Students will undergo two activities related to verbal/nonverbal skills from following:
   a. Appearing for mock personal interviews.
   b. Participating in Group Discussions on current affairs/social issues/ethics and etiquettes.
   c. Participating in Games, Role Playing exercises to highlight nonverbal skills.

5. Students will submit one written technical documents from following:
   a. Project proposal.
   b. Product brochure.
   c. Literature survey on any one topic.
   d. User manual.
   e. Technical help.

6. Students will submit one written business documents from following:
   a. A representative Official correspondence.
   b. Minutes of meeting.
   c. Work progress report.

7. Students will participate in one or two activities from following:
   a. Team games for team building.
   b. Situational games for Role Playing as leaders, members.
   c. Organizing mock events.
   d. Conducting meetings.

8. Faculty may arrange one or more sessions from following:
   a. Yoga and meditation.
   b. Stress management, relaxation exercises, and fitness exercises.
   c. Time management and personal planning sessions.
   d. Improving memory skills.
   e. Improving leadership skills.
   f. Improving English conversation skills.
   g. Reading comprehension skills and Notes taking skills.

Students are expected to keep a personal record of ANY SIX activities that they undertook in the Soft skills Laboratory in the form of a journal. All students need not do the same assignments. Colleges have a freedom within the framework to customize set of activities to be followed.

Guidelines for Conduction and Assessment of Laboratory Work

1. This laboratory can be seen as a departmental activity with one of the faculty as coordinator.
2. Professionals from HRD departments of companies could assist in training sessions.
3. Certain activities can even be team activities such as technical report submission or joint presentations.
4. Popular science, INTERNET, Magazines, Newspapers, and Training MEDIA from BCL, BBC, Management Institutes, and Management Gurus can also be used as resources.
5. Generally an exercise can be designed to allow multiple skills exposure for example a group task encouraging discussions, team building, value sharing, leadership and Role Play all at the same time.
ASSESSMENT Guidelines

1. WRITTEN Communications 20 Marks
   a Students could submit for example
      b Personal resume, essay
      c Technical document or business document.

2. Spoken communications 20 Marks
   a One elocution event of say 8-10 minutes individually
   b One group discussion or group presentation event

3. Overall participation in soft skills based lab activities 10 Marks
   a Attendance and enthusiasm
   b Participation and contribution in event management, organizing
   c Group games, group exercises, interpersonal skills observed.
   d Quality of journal for soft skills laboratory indicating personal progress, participation.

Guidelines for batch wise Time management for laboratory sessions (Two hour session at a time)

A Semester allows for 12-14 sessions. Students can do Lot of preparation at leisure time.

1. Batches could be of size 25 to 30 students.
2. Written communication exercises could be done for whole batch at same time (3 sessions)
3. Spoken communications exercises can be done with around 10-15 students covered in one two-hour slot so total need for one exercise. (2 sessions).
4. Group discussions could be done for groups of 5-8 students at a time for half hour so total need for two group discussions for each student of the batch will be required. (2 sessions).
5. Sessions could be organized for trainers to give directions, knowledge, experience sharing or common viewing of training material on Video etc. (4 sessions).
6. Group exercises for team building, role-playing and interaction with professional. (3 sessions)
510909: OBJECT ORIENTED PROGRAMMING

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Theory: 70 Marks

Unit I : Introduction to Object Oriented Programming (6 Hrs)
Introduction to procedural, modular, object-oriented and generic programming techniques, Limitations of procedural programming, Need of object-oriented programming, fundamentals of object-oriented programming: objects, classes, data members, methods, messages, data encapsulation, data abstraction and information hiding, inheritance, polymorphism.

Unit II : Programming with C++ (6 Hrs)
C++: Extensions to C: Variable declarations, global scope, ‘const’, reference variables, comments, default parameters, function prototypes, function overloading, inline functions, default and constant arguments, ‘cin’, ‘cout’, formatting and I/O manipulators, new and delete operators

Unit III : Classes and Objects (6 Hrs)
Defining a class, data members and methods, public, private and protected members, inline member functions, static data members, static member functions, ‘this’ pointer, constructors, destructors, friend function, dynamic memory allocation, array of objects, pointers and classes, class as ADTs and code reuse

Unit IV : Operator Overloading (6 Hrs)
Introduction, Need of operator overloading, overloading the assignment, binary and unary operators, overloading using friends, rules for operator overloading, type conversions

Unit V : Inheritance and Polymorphism (6 Hrs)
Concept and need, single inheritance, base and derived classes, friend classes, types of inheritance, hybrid inheritance, member access control, static class, multiple inheritance, ambiguity, virtual base class, polymorphism, virtual functions, pure virtual functions, abstract base class, virtual destructors, early and late binding, container classes

Unit VI : Managing Console I/O Operations: Introduction, C++ streams, stream classes, unformatted I/O, formatted I/O and I/O manipulators

Files and Streams
Concept of a file, file operations, streams, opening and closing a file, detecting end-of-file, file modes, file pointer, structures and files, classes and files, sequential file processing, Error handling

Text Books:

Reference Books:
Teaching Scheme: Lectures: 4 Hrs / week

Examination Scheme: Theory: 70 Marks

Objectives:

1. To study the representation, implementation and applications of basic data structures
2. To develop the ability to synthesize and analyze algorithms

Unit I (8 Hrs)
Introduction to data structures: Concept of data, Data types, Data Object, Data structure, Abstract Data types (ADT), realization of ADT in C, Linear data structures using sequential organization: Concept of sequential organization, Concept of Linear data structures, arrays as ADT, Multidimensional arrays, Storage representations (row major and column major and their address calculation). Concept of ordered list and polynomial representation using arrays, Representation of sparse matrix using arrays, fast transpose for sparse matrix

Unit II (8 Hrs)
Linear data structures using linked organization: Concept of linked organization, singly linked list, doubly linked list, circular linked list, Insertion, deletion and traversal on above data structures. Representation and manipulations of polynomials using linked lists

Unit III (8 Hrs)
Stacks and queues: Concept of stack and queues as ADT, Implementation of stacks using sequential and linked organization, linear queue, circular queue using linked and sequential organization, Application of stack for expression conversion, recursion

Unit IV (8 Hrs)
Non-linear data structures:
Trees and binary trees-concept and terminology, Data structures for binary trees, Algorithm for tree traversals, Conversion of general tree to binary tree. Binary search trees,
Graphs: Representation of graph - Adjacency matrix and Adjacency list, Graph traversals

Unit V (8 Hrs)
Searching and Sorting
Searching: Sequential, binary and Index sequential search, Sorting: General concepts: sort order, sort stability, efficiency and passes, Bubble sort, Quick and Merge sort.

Unit VI (8 Hrs)
Files:
Organization of files: sequential and direct access file, hashing function and it’s characteristics, collision resolution, linear probing, chaining with and without replacement, rehashing, simple Index file
Text Books:


REFERENCES:

510911: OPERATIONS RESEARCH

Teaching Scheme: Lectures: 4 Hrs/Week
Examination Scheme: Theory: 70 Marks

Unit I (6 Hrs)
**Introduction to Linear Programming** - Construction of the LP Model - Graphical LP Solution - Computer Solution of LP Models, The Simplex Method: Standard LP Form and its basic solutions - the Simplex Algorithm, Artificial Starting Solution, Special Cases in simplex method application. Duality and Sensitivity Analysis: Definition of the Dual Problem - Relationship between the Optimal, Primal and Dual Solutions, Dual Simplex Method - Primal – Dual Computations, Postoptimal of Sensitivity Analysis

Unit II (6 Hrs)
**Transportation Model and its variants:** Definition of the Transportation Model - Nontraditional Transportation Models-the Transportation Algorithm-the Assignment Model– The Transshipment Model

Unit III (6 Hrs)
**Network Models: Scope of Network Applications** - Network Definitions, Minimal Spanning Tree Algorithm, Shortest Route Problem, Maximal flow model, Minimum cost capacitated flow problem - CPM and PERT

Unit IV (6 Hrs)
**Goal Programming:** Goal Programming Algorithms
Integer Linear Programming: Integer-Programming Solution Algorithms
Forecasting Models: Moving Average technique, Exponential smoothing, regression

Unit V (6 Hrs)
**Decision Analysis:** Decision - Making under certainty - Decision - Making under Risk, Decision under uncertainty.

Unit VI (6 Hrs)
**Simulation Modeling:** Monte Carlo Simulation, Generation of Random Numbers, Method for Gathering Statistical observations

Reference Books:

510912: MICROPROCESSOR APPLICATIONS

Teaching Scheme:                         Examination Scheme:
Lectures: 4 Hrs/Week                     Theory: 70 Marks

Objectives:
• To learn the architecture and assembly language programming of 8085 microprocessor
• To study the peripherals and their interfacing with 8085 microprocessor.
• To provide insight to DOS and BIOS and their functions.

Unit I                                      (8 Hrs)
Introduction to 8-bit processor architecture, 8085 microprocessor architecture, Pin Diagram,
Functional Block Diagram, Concepts of Tri-state logic, Latches, Buffers and Decoders, 8085 based
system with associated latches, buffers, Memory interfacing: Memory Map, Address decoding logic

Unit II                                     (8 Hrs)
8085 Programmer’s model, 8085 Addressing modes and Instruction set, Machine code and Assembly
language programming, Assembler directives, Stacks and subroutines. Timing diagrams: Instruction
and machine cycles and wait states

Unit III                                    (8 Hrs)
I/O programming, Memory mapped I/O, I/O mapped I/O, Polled I/O, I/O ports using latches, PPI 8255,
Various operating modes of 8255, interfacing, and programming, 4x4 key matrix interfacing, Seven
Segment display interfacing

Unit IV                                     (8 Hrs)
8085 Interrupt structure, ISR, Introduction to 8253 Timer

Unit V                                      (8 Hrs)
Introduction to 16 bit processor - 8086/8088 architecture, minimum and maximum mode,
programmers model - Instruction encoding format

Unit VI
Introduction to 8086 assembly language programming. BIOS and DOS calls.

Text Books:
100462 – 9.
International, ISBN 0 85226 297 3

Reference Books:
81 – 7029 – 485 – 1 (Chapters 2, 3, 4, 14).
7.
510913: MANAGEMENT INFORMATION SYSTEMS

Teaching scheme: Lecturers: 4 Hrs/Week
Examination Scheme: Paper: 70 Marks

Objectives:

- To learn and understand fundamentals of Information Systems
- To learn and understand architecture, methodology and applications of MIS

Unit I  (8 Hrs)
Foundations of Information systems and Management: Why Information systems? Components and resources of information systems, Information system activities, Types of information systems: Operations support systems and Management support systems
Management Information Systems: Definition, role and impact of MIS, Introduction to Management, Approaches to Management, Functions of the managers: Management effectiveness, planning, organizing, staffing, coordinating and directing, MIS as a support to the management and a tool for management Process, Organization structure and theory: Organization structure, behavior, organization as a system, MIS: Organization
Strategic Management of Business: Concept of Corporate Planning, Essentiality of strategic planning, development of business strategies, types of strategies, MIS for Business Planning
Infrastructure management: Selection, maintenance of hardware, communication equipments and software as per MIS needs of the organization. Ensure uptime of hardware resources, database management, end user training etc.

Unit II  (8 Hrs)
Applications of MIS
Service Sector: Introduction, MIS applications in service industry
Implementation Challenges: Integration, implementing IT, End user Resistance and Involvement, Change Management

Unit III  (8 Hrs)
Business Process Re-engineering (BPR): Introduction, Business process, Process and Value stream model of the organization, MIS and BPR
Business Process Outsourcing (BPO): What is BPO? Voice BPO i.e. Call center, non-voice BPO, Scope of BPO, challenges in BPO management etc.

Unit IV  (8 Hrs)
Customer relationship Management: Introduction, What is CRM? Three phases of CRM, Benefits, challenges and trends in CRM
Supply Chain Management: What is SCM? Role of SCM, Benefits, challenges and trends in SCM

Unit V (8 Hrs)

Decision support systems: Concept and philosophy, Using Decision Support systems: What-if analysis, sensitivity analysis, Goal-seeking analysis, Optimization analysis, Introduction to Data Warehouse: Architecture, Organization and Management of Data Warehouse, Implementation, Data Mining for Decision support, Executive Information systems, Enterprise Information portal and knowledge management systems, Introduction to Artificial Intelligent systems, Knowledge Based Expert systems and GIS

Unit VI (8 Hrs)

Security and Ethical Challenges: Introduction, Ethical responsibility of Business Professionals, Computer crime, Hacking, Cyber Theft, Software Piracy, Privacy issues, Health issues
Global Management of Information Technology: Cultural, political and Geo-economic challenges, global business/it strategies, applications, platforms and Data access issues

Note:- Lecturers by experts from industry should be arranged.

Text Books:


Reference Books:

510914: DATA STRUCTURES LABORATORY

Teaching Scheme:   Examination Scheme:
Practical: 4 Hrs/Week  Term Work: 50 Marks
                                    Practical: 50 Marks

Suggested List of Assignments

1. Represent sparse matrix using array and perform simple transpose, fast transpose and matrix addition.
2. Write a menu driven program to perform following operations on singly linked list: Create, Insert, Delete, Display, Reverse
3. Create two doubly linked lists. Sort them after creation using pointer manipulation. Merge these two lists into one list so that the merged list is in sorted order. (No new node should be created.)
4. Represent polynomial as a circularly linked list and write a menu driven program to perform addition, multiplication and evaluation.
5. Implement stack as an ADT. Use this ADT to perform expression conversion and evaluation. (Infix – Postfix)
6. Implement circular queue using arrays.
7. Implement following sorting methods: Merge sort, Heap sort
8. Create binary tree and perform recursive traversals.
9. Implement binary search tree as an abstract data type.
10. Create binary search tree. Find height of the tree and print leaf nodes. Find mirror image, print original and mirror image using level-wise printing.
11. Represent graph using adjacency list and perform DFS and BFS.
12. File Handling

Note:
1. Proper indenting, coding styles, commenting, naming conventions should be followed.
2. Avoid using global variables as far as possible
3. Use of functions is necessary
4. Faculty should prepare a lab manual including standard test cases and should be available to students for reference

Student should submit term work in the form of a journal consisting of minimum 16 assignments based on the above list. Practical examination will be based on the term work, and questions will be asked during the examination to judge the understanding of the practical performed at the time of examination. Candidate is expected to know the theory involved in the experiment.
510915: OBJECT ORIENTED PROGRAMMING LABORATORY

Teaching Scheme: Practical: 4 Hrs/Week
Examination Scheme: Term Work: 50 Marks
Practical: 50 Marks

Suggested List of Assignments

Assignment – 1: Design a Class ‘Complex’ with data members for real and imaginary part. Provide default and parameterized constructors and member functions to get, set, display, add, subtract, multiply and divide two complex numbers.

Assignment – 2: Design and Implement Class ‘String’ with a default, parameterized and copy Constructors. Provide member functions to accept and display string and friend function to concatenate and compare two strings without using operator overloading.

Assignment – 3: Design a class “Distance” with kilometers, meters, centimeters as data items. Provide parameterized and copy constructor and overload ‘+’, ‘-’, ‘*’, ‘<<’ and ‘>>’ operators or Design a class “Time” with Hours, minutes and seconds as data members. Provide parameterized and copy constructor and overload ‘+’, ‘-’, ‘<<’ and ‘>>’ operators.

Assignment – 4: Write a class ‘Point’ with x and y coordinates as data members. Derive two classes ‘Line’ and ‘Circle’ from ‘Point’ with appropriate data members. Derive a class ‘Triangle’ from class ‘Line’. Implement read () and draw () member functions for all the above classes.

Assignment – 5: An organization has to maintain information of employees for calculation of salary. An Employee can be a ‘Waged employee’ or a ‘fixed salaried employee’. A waged employee is paid on hourly basis. A ‘Salesperson’ is a Waged employee who is paid commission on the sales made.
Design all the above classes and implement member functions to accept the employee details, display employee details and Compute the salary of an employee.

Assignment – 6:
a) Write a template function SWAP () to swap the variables of type int, char and complex.
b) Design template class ‘QUEUE’ with relevant data members. Implement member functions to add an element and delete an element from queue. Test this class for putting integer and character data items in the queue.

Assignment – 7: Declare class ‘STACK’ and handle the run time anomalies like Overflow – when the stack is full and Underflow – when the stack is empty. Display error numbers and error message when error is thrown.

Assignment – 8: Write a ‘C++’ Program to maintain the employee details using files. Implement functions to add a new employee, delete a record of an employee, modify an employee detail and display the details of an employee.

Assignment – 9: A bank maintains three kinds of accounts for customers -- Savings account, fixed deposit account and Current account. The Saving account provides compound interest and withdrawal facilities but no chequebook facility. The fixed deposit account can be Short term, Long term or Medium term. The current account provides chequebook facility but no interest.
Both savings and current account holders should maintain minimum balance and if the balance falls below the minimum balance amount, a service charge is imposed. Design all the classes and provide necessary member functions to deposit and withdraw amount, check for minimum balance and compute and deposit the interest.

**Note:**

1. Proper indenting, coding styles, commenting, naming conventions should be followed.
2. Avoid using global variables as far as possible
3. Use of functions is necessary
4. Faculty should prepare a lab manual including standard test cases and should be available to students for reference

Student should submit term work in the form of a journal consisting of minimum 14 assignments based on the above list. Practical examination will be based on the term work and questions will be asked during the examination to judge the understanding of the practical performed at the time of examination. Candidate is expected to know the theory involved in the experiment.
Suggested List of Experiments

Assembly Language Programming of 8085

1. Arranging the numbers
2. Lookup table for BCD to Seven Segment Conversion etc.
3. Programs using subroutines.
4. Multiplication by shift and add.

Assembly Language Programming of 8086

1. Code conversion.
3. String Manipulations
4. DOS Interrupt 21H

Interfacing of

1. 8255 Operations in various modes
2. ADC, DAC interfacing.

Staff members will suitably frame assignments. Students will submit the term work in the form of journal with at least 10 assignments.
Guidelines for setting question paper at the First Year Master in Computer Applications (MCA) 2008 course under faculty of Engineering to be effected from the academic year 2008 – 2009

1) Since the syllabi of all the subjects in this curriculum is unitized in SIX units, equal weight age shall be given to all the units with respect to number of questions and allotted marks
2) Each paper shall consists of TWO sections viz. Section A and B. Units I through III shall be under Section A and Units IV through VI shall be under section B.
3) Every unit shall carry TWO questions with internal choice/option offered to the candidate as follows

Section A

<table>
<thead>
<tr>
<th>Unit – I</th>
<th>Q. 1 OR Q. 2</th>
<th>MARKS 12/11</th>
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<tr>
<td>Unit – II</td>
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<tr>
<td>Unit – III</td>
<td>Q. 5 OR Q. 6</td>
<td>MARKS 12/11</td>
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Section B

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<tr>
<th>Unit – IV</th>
<th>Q. 7 OR Q. 8</th>
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<tbody>
<tr>
<td>Unit – V</td>
<td>Q. 9 OR Q. 10</td>
<td>MARKS 12/11</td>
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<tr>
<td>Unit – VI</td>
<td>Q. 11 OR Q. 12</td>
<td>MARKS 12/11</td>
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