

UNIVERSITY OF PUNE

Syllabus for Master Degree in Computer Management (M.C.M.)

[M.C.M. Part I From Academic Year 2008-2009,
M.C.M. Part II From Academic Year 2009-2010]

(I) INTRODUCTION

1. The name of the programme shall be Masters' Degree in Computer Management (M.C.M.)
2. The knowledge and skills required to plan, design and build complex application software systems are highly valued in all industry sectors including business, health, education and the services. The basic objective of the Masters' Degree in Computer Management (M.C.M.) is to provide to the country a steady stream of competent young men and women with the necessary knowledge, skills and foundations for acquiring a wide range of rewarding careers into the rapidly expanding world of Information Technology.
3. The Job Opportunities are :
 - a. Many graduates begin their careers as junior programmers and, after some experience, are promoted to senior programmers, systems analysts, programmer/analysts, software testers posts. Others seek entrepreneurial roles in the computer world as independent business owners, software authors, consultants, or suppliers of systems and equipment. Career opportunities exist in such areas as management, software and hardware sales, technical writing, training others on computers, consulting, software development and technical support.
 - b. Application areas include transaction processing (such as order processing, airline, railway reservations, banking systems), accounting functions, sales analysis, games, forecasting, simulation, database management, decision support data communications, and e-commerce.
4.
 - a. The first two semesters of the programme is a mix of computer-related and general business courses. The computer-related courses use computers to introduce standard techniques of programming; the use of software packages systems analysis and design. The general business courses include the functional areas of management like and the study of marketing management, financial management, operations management and general management . The course would emphasize the study and creation of business applications, rather than mere programming. Considering the current environment, fundamental concepts related to web-based applications are introduced.
 - b. In semesters III and IV, students are exposed to system development in the information processing environment, with special emphasis on Management Information Systems and Computer Resource Management.
5. **Duration:** The M.C.M. program will be full-time two years' Master's Degree in Computer Management.

6. The new curriculum would focus on imparting skills, necessary for developing a career in the field of business applications of computer, in emerging global scenario which emphasizes e-business in all sectors of the economy.
7. The institutes should organize placement program for the MCM students, by interacting with the industries and software consultancy houses in and around the region in which the educational institution is located.
8. **Intake:** In each class, not more than 60 students will be admitted.

(II) ELIGIBILITY FOR ADMISSION

Graduates possessing any faculty of any statutory University shall be eligible for admission to the M.C.M. course.

(III) NUMBER OF LECTURES AND PRACTICALS :

Lectures and practicals should be conducted as per the scheme of lectures and practicals.

(IV) PRACTICAL TRAINING AND PROJECT WORK:

Towards the end of the second year of study, a student will be examined in the course "Project Work".

- a. 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 monitor the progress of individual student.
- b. Student 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 31st March. Wherever possible, a separate file containing source-code listings should also be submitted.
- c. The Project Work should be of such a nature that it could prove useful or be relevant from the commercial / management angle.
- d. The project report will be duly assessed by the Internal guide of the subject and marks will be communicated by the Director to the University after receiving the Seat numbers from the University along with marks of the internal credit for theory and practicals to be communicated for all other courses.
- e. The project report should be prepared in a format prescribed by the University which also specifies the contents and the method of presentation.
- f. The project work will carry 80 marks for Internal assessment and 120 marks for external viva. The external viva shall be conducted by a minimum of two external examiners.
- g. Project Work can be carried out in the Institute or outside with prior permission of the Institute.
- h. The external viva-voce examination for Project Work would be held in March/April of the second year of study, by a panel of two external examiners.

(IV) ASSESSMENT

The final total assessment of the candidates is made in terms of an Internal assessment and an external assessment for each course.

For each paper, 30% marks will be based on internal assessment and 70% marks for semester end examination (external assessment), unless otherwise stated.

The division of the 30% marks allotted to internal assessment of theory papers is on the basis of tutorial work and written test of 15 marks, seminars and presentations 10 marks and attendance 5 marks.

The internal marks will be communicated to the University at the end of each semester, but before the semester end examinations. These marks will be considered for the declaration of the results.

(V) EXAMINATION

Examinations shall be conducted at the end of each semester i.e. during April/May and also in October/November.

(VI) STANDARD OF PASSING

- a. Every candidate must secure 40% marks in each head of passing.
- b. The passing marks for external examination will thus be 32 out of 80 and for internal examination 8 out of 20 and aggregate marks taking both together will be 40 marks.

- c. Reassessment of Internal marks :

In case of those students who have secured less than passing percentage of marks in internal i.e. less than 40%, the institute will administer a separate internal test. The results of which may be conveyed to the University as the Revised Internal Marks.

In case the result of the internal test as above, results in lower marks than the original, the original figure of the marks will prevail. In short, the rule is higher of the two figures of the marks.

However, the institute will not administer any internal test, for any subject for those candidates who have already scored 40% or more marks in the internal examination.

(VIII) BACKLOG

Two semesters backlog can be carried to the third semester.

(IX) CLASS

There shall be numerical marking for each question. At the time of declaration of the result, the marks obtained by a candidate are converted into classes as shown below:

The class will be awarded on the basis of aggregate marks scored by the student (i.e. out of 2200), provided he/she has passed in both the internal/external examinations of all the subjects in M.C.M. Part I and Part II.

CLASS	TOTAL MARKS
First Class with Distinction	1540 and above
First Class	1320 to 1539
Higher Second Class	1210 to 1319
Second Class	1100 to 1209
Pass Class	880 to 1099
Fail	879 and below

(X) MEDIUM OF INSTRUCTION

The medium of instruction will be English.

(XI) REVISION OF SYLLABUS

As the computer technology is changing very fast, revision of the syllabus should be considered every 3 years.

(XII) TEACHING AND PRACTICALS SCHEME

Each Session will be of 1 and 1/2 Hrs. (Includes Lecture & Practical)

For a Year : 28 Weeks Teaching , 12 Weeks Vacation , 12 Weeks PPL & Exam

Semester I

Subject Code	Subject Name	Mark	Type	Sessions Lectures
101	C Programming	100	C	40
102	Fundamentals of Information Technology	100	C	40
103	Software Engineering and Business Process	100	C	40
104	PPM and OB	100	C	40
105	Web Programming and E-Commerce	100	C	40
106	Practical	50	FI	

Semester II

Subject code	Subject Name	Mark	Type	Sessions Lectures
201	Data structure and Algorithms	100	C	40
202	DBMS	100	C	40
203	Oracle	100	C	40
204	Basic Java OR Core Ruby	100	C	40
205	Object Oriented Designing	100	C	40
206	Practicals	50	FI	

Semester III

Subject code	Subject Name	Mark	Type	Sessions Lectures
301	Linux	100	C	40
302	Business Application	100	C	40
303	Advance Java OR Advance Ruby	100	C	40
304	VB.NET	100	C	40
305	Software Project Management	100	C	40
306	Practicals	50	FI	

Semester IV

Subject code	Subject Name	Mark	Type	Sessions Lectures
401	** Mobile Computing	100	C	40
402	**ASP.NET	100	C	40
403	**Information Security	100	C	40
404	**Cyber Law	100	C	40
405	**Multimedia and Web Designing Or SOFT SKILLS [405]	100	C	40
406	Quality Control and Software Testing	100	C	40
407	Network Technologies	100	C	40
408	Project	100	C	
409	Project	100	C	
410	Practicals	50	FI	

(C) : Compulsory, subject to be evaluated by the University

(FI) : Fully Internal to be evaluated by the Institute.

- Student can choose any **three** subjects(401-408) from the above mentioned Elective which is discreetly offered by the Institute.
- Practical will be included in IT papers
- No separate practical exams will be conducted
- Case studies should be taken for non-IT papers
- In Total 72 hours practical to be taken per semester.

SEMESTER 1

'C' Programming – [101]

1) C Fundamentals:

(3)

C Character Set, Identifiers and Keywords under ANSI C. Data Types, Constants: int, float, double, char. Qualifiers: long, short, unsigned and signed. Escape sequences (like \n,\b etc.). Arithmetic Expressions and different built-in Operators. Pre-processor directives (like #include, #define), concept of header files, Symbolic constants, Comments, sizeof., steps involved in translation of C Program. Concept of typedef for renaming a built-in data type.

2) Flow Charts and Decision Table

(2)

Flow Diagram, Flow Chart symbols and their use, System flowcharts, program flowcharts, outline flowcharts, detail flowcharts, flowcharts and signs of communications, flow lines, process decisions, connectors, terminals, flowcharts for simple programs-problems.

Decision tables, condition stub, condition entry, action stub, action entry, decision rule, limited entry decision tables, extended entry decision table, mixed entry decision tables, comparison between flowcharts and decision tables.

3) Built-in operators and functions.

(2)

Console based I/O and related built-in I/O functions: printf(), scanf(); getch(), getchar(), putchar(), gets(), puts().

4) Decision and Case Control Structure

2)

if statement; if-else construct; use of logical operators and Compound Relational Tests; Nested if statements; The else if construct; the relational operators; the conditional expression (ternary) operator. The Switch Statement with or without break, concept of a case label, goto statement, concept of a goto label, comparison between goto and case labels.

5) Loop Control Structure

(2)

Concept of Loop, loops supported by 'C', concept of top tested and bottom tested loops, the for loop statement; Nested for Loop ; for loop variants; the while loop statement; simple and nested while loop, Increment/decrement operators; Use of Break and Continue; the do-while loop, comparison between for, while and do while loops.

6) Storage Classes

(1)

Automatic, Register, Static (local and global), External. Scope rules.

7) Arrays

(4)

Concept of a collection, types of collections supported by 'C', Array collection and its features, concept of indexing, index variable, index type, positional value of a member of array collection, concept of dimension and size of an array, 'C' syntax for declaration of array, name of the array and its type, Referring individual elements, Entering data into an

array, reading data from an array concept of Array initialization and list of initializers, size option, Bounds checking, the concept of two dimension arrays and related syntax, similarities between dimension and nesting.

8) Character Strings (2)

What are strings, standard library string functions like strlen(),strcat(), strcpy(), strcmp(), similarity between string and 1-D array of char.

9) Functions (4)

Concept of a subprogram, the interface of a subprogram, role of a interface, Arguments of a subprogram, kinds of subprograms supported by C, return statement as an interface, local variables; Default Return type and the type void; Passing values between functions through interfaces; Declaration of function type; iterative and recursive subprograms, Recursion; concept of call by value, call by reference, return and their underlying implementation should be explained, similarities and differences between Function & Macros, concept of nested macros and their use, recursion as a special nested call.

10) Pointers (4)

Concept of Pointers, Pointer as an address variable, concept of a pointer data type and its syntax, built-in address operator, Pointers to existing variables of different data types and their uses, use of indirection operator, the name of the array as a pointer variable, Pointers and Arrays, Pointers arithmetic, use of unary operators (++ , --), One Dimension Arrays and Pointer, concept of array of pointers and simple use, command line arguments for the main, pointer as a return type of a function.

11) Structures (3)

Structure as a homogeneous and heterogeneous collection, possible applications, syntax of declaring structure, Initializing structures, structure variables, accessing structure elements using member operator, Arrays of Structures, and array as member of structure, conceptual difference between array and structure collection, Functions and Structures, nested structures, concept of anonymous structures and their use, Concept of self referential structure, pointer as member of structure and pointer to structure use of member selector operator(->), comparison between indirection (*) operator and member selector operator (->), structure as an argument to function and return type of a function.

12) Unions (2)

Concept of Union collection, Syntax of declaration and its use, comparison of Array, Structure and Union, array of unions and union as a member of structure, structure as a member of union and array as member of union, concept of memory saving and union, union as a generic data type, concept of anonymous union.

13) Console based I/O (2)

use of console as a file environment, use of keyboard and VDU as I/O files: Use of stdin, stdout, stderr and stderr as built-in file pointers for console environment, use of printf(), scanf() as fprintf() and fscanf(), use of fflush().

14) File based I/O**(3)**

Concept of a file, text files in 'C', concept of a predefined FILE pointer and its definition as given in header file stdio.h, meanings of different members of the structure representing FILE, Disk I/O Functions: High level file I/O or standard functions- fopen(), putc(), getc(), fclose(), fgets(),fputs(),feof(), simple file based programs showing the working of different members of FILE structure.

15) Dynamic Memory Allocation and Memory functions**(1)**

Concept of dynamic environment as run time environment, concept of dynamic memory management, use of built-in dynamic memory management tools of 'C' viz. malloc(), free(), simple programs using malloc() and free()

16) Bitwise Operator**(2)**

Concept of modifying the value using bit shifting, built-in bit shift operators left bit shift operator(<<) and right bit shift operator (>>) their uses, limitations of bitwise operators, use of bitwise relational operators.

17) Other features and Miscellaneous functions**(1)**

Use of atof(), atoi(), atol(), toupper(), tolower(), isalnum(), isalpha(), isdigit(),exit().

Rules :

ANSI C to be followed strictly

Structured programming techniques to be followed

Programs to be coded in 'C' should be preferably from Commerce / management fields.

Books:

- *Let us C* by Yashwant Kanetkar
- *C Programming* by Balgurusamy
- *Turbo C/C++ - The Complete Reference* by H. Schildt.
- *Programming in C* by S. Kochan.
- *Born to code in C* by H. Schildt.
- *The Art of C* by H. Schildt.
- *C Programming by Kernighan and Ritchie - 2nd Edition.*
- *Programming in ANSI C* by Agarwal
- *C Programming with Problem Solving* by Jacqueline A Jones, Keith Harrow

Fundamentals of Information Technology [102]

- **Introduction** (4 Lectures)
 - Characteristics of Computers
 - Computer Generations
 - Types of Computers
 - Digital Block Diagram and different units
 - Input, Output, Storage and process Devices
- **Number Systems** (5 Lectures)
 - Non Positional Number System
 - Positional Number System (Binary, Octal, Hexadecimal Number Systems)
 - Conversion of One Number System to Another
 - BCD, EBCDIC, ASCII
- **Memory Managements** (4 Lectures)
 - Primary Storages
 - Storage Capacity : Bit, Byte, MB, KB, GB, TB
 - RAM, ROM, PROM, EPROM
 - Cache Memory, function of Cache Memory
 - Secondary Storages: Punch Card, Magnetic Tape, Magnetic Disk, Floppy Disc, CD, DVD, Hard Disk, Pen Drive
- **Operating System** (12 Lectures)
 - Definition and Functions
 - Evolution of Operating System
 - Types of Operating System
 - Difference between Windows and Open source Operating System
 - Batch Processing, Spooling, Multiprocessing, Multiprogramming, Time-Sharing, On-Line Processing, Real-Time Processing,
 - High Level Language, Low Level Language,
 - Language Converter: Compiler, Interpreter, Assembler
- **Networking** (8 Lectures)
 - Introduction, LAN, WAN, MAN, Intranet, Internet
 - Internet Topologies
 - OSI Model (Seven layers)
 - Communication Media
- **Practical Approach** (7 Lectures)
 - Computer Assembly
 - Handling Boot Setup
 - Installation of Operating System and Server
 - Connecting your client to server
 - User and Workgroup Handling

Reference Books

Computer Fundamentals	: P.K. Sinha
Computer Fundamental	: Ram B
Computer Fundamental	: Oka Milind M
Computer Fundamental	: Rajaraman

Software Engineering And Business Process – [103]

- **Methodology must be case study oriented through out the syllabus.**
- **Faculty must design different cases and ask students to make presentations may be in groups and do proper assessment.**

- 1) System Concept** (2)
Definitions, Integrated Systems, Sub-systems, Modules,
Characteristics / Objectives / types of Systems.
- 2) Various Phases of Software Development Life Cycle (SDLC)** (2)
- 3) Role of Software Engineer / Analysts / Users in the various phases of Systems Development Life Cycle.** (2)
- 4) Different Approaches to Software Development** (4)
Waterfall Model , Spiral Model, Prototyping, RAD, Object Oriented, 4GL
- 5) Structured Systems Analysis Tools and Techniques** (2)
Fact Finding tools and techniques
Functional Decomposition Diagram (FDD)
- 6) Application System Modeling** (8)
Data Modeling through ER Model
Process modeling through Data Flow Diagrams (Logical / Physical)
Concepts of Object Oriented Modeling through State Transition
Diagrams
- 7) Database Design Methods** (6)
Mapping ER Diagram to arrive at the Relational Database
Data Normalization techniques
Controlled De-normalization
- 8) Logic representation techniques** (2)
Decision Trees
Decision Tables
Structured English
- 9) UML tools and techniques for web-based/object oriented Applications** (3)
Class hierarchy Diagram, Use-Case Diagram, Sequence Diagram
- 10) User Interfaces Design** (4)
Menu, Forms, Reports, Messages, Screens
- 11) Data Codification Schemes, Designing Code-less systems** (1)

**12) Standards of Source Code Development,
Structured Programming.** (2)

**13) Introduction to Computer Aided Software Engineering (CASE) tools,
Concept of Reverse Engineering.** (2)

Books Recommended:

- *Analysis and Design of Information Systems 2e* by Senn
- *Software Engineering Practitioner's Approach* by Roger Pressman
- *Introduction to System Analysis & Design* by Hawryszkiewicz.
- *Systems Analysis and Design* by Elias Awad
- *Introducing Systems Analysis and Design* by Lee
- *Systems Analysis & Design* by Perry Edwards (McGraw Hill)
- *Systems Analysis, Design & Introduction to Software Engineering(SADSE)* -Parthasarthy S, Khalkar B W

Principles and Practices of Management and Organisational Behavior (104)

The perspective

The purpose in designing and revising this courseware is to help the MCM students to get acquainted with the basic concepts of Management, Organisation, Organisational Behaviour and MIS, mainly from the managerial perspective.

Section 1: Essence of Management

Unit 1 Management

(4)

- The need, scope
- Meaning and definition
- The process of management
- Managerial levels/Hierarchy
- Managerial functions
 - Planning
 - Organising
 - Staffing
 - Directing
 - Controlling
- Managerial skills
 - Technical
 - Conceptual
 - Human Resource
- Types of managers
 - Functional
 - Specialist
 - Generalist
- Line and staff managers

Unit 2 Evolution of Management Thought

(4)

- 2.1 Historical perspective
- 2.2 Classical theories
 - Taylor
 - 2.2.2 Fayol
- 2.3 Behavioral
 - H.R. approach
 - Behavioral Science approach
 - Management Science approach
 - Systems approach – with reference to management, organisation and MIS
 - Contingency approach

Unit 3 Managerial Decision making

(4)

- Introduction
- Decision making environment
 - Open system
 - Closed system
 - Decision making under certainty

Decision making under uncertainty
Decision making under risk

Decision types / models
Structured decisions
Unstructured decisions
Programmable decisions
Non programmable decisions
Classical model
Administrative model
Decision making styles
Autocratic
Participative
Consultative
Decision making tools
Herbert Simon's model

Principle of Rationality / Bounded Rationality

Section II Organisation and Organisation Behavior

Unit 1 Organisation	(4)
Introduction - definition	
Need for organisation	
Process of organising	
Organisational structure	
Functional organisation	
Product organisation	
Territorial organisation	
Customer segmentation	
1.4.5 Matrix organisation	
Unit 2 Organisational Behavior	(2)
Definition / concepts	
Need / importance / relevance	
An overview	
Unit 3 Individual Behavior and Understanding Self	(4)
Ego state	
Transactional Analysis	
Johari window	
Motivation	
Unit 4 Group and Group Dynamics	(4)
Unit 5 Team Building	(4)
Unit 6 Leadership	(3)
Unit 7 Conflict Management	(3)
Unit 8 Theory X Y and Z	(2)

Important note : The topics in Units 3, 4 , 5 and 6 should be covered with the help of atleast one exercise each. All topics in Organisation Behavior should be covered with the help of role plays, case studies , simulation , games etc.

Books Recommended :

- *Principles and Practices of Management* by Koontz & O'neon
- *Management Today Principles and Practices* by Burton & Thakur
- *Management Principles & Functions* by Ivancevich & Gibson , Donnelly
- *Organisational Behavior* by Stephen Robbins
- *Organisational Behavior* by Keith Davis
- *Organisational Behavior* by Fred Luthans
- *Organisational Behavior* by Dr. K. Ashwatthapa

Web Programming and E-Commerce [105]

Course Objectives

- To introduce the main concepts related to electronic commerce
- To understand the various forms of electronic commerce and common applications in electronic commerce
- To be able to analyze e-commerce systems currently in operation, such as electronic payment systems
- To explain the range of threats to e-commerce security
- To explain how security techniques can be used to protect e-commerce transactions.
- To encourage group discussion of examples and techniques, and application of them to real-life situations to build up students' critical analytical thinking capabilities
- To introduce standard protocols and security provisions commonly used in industry and government organisations. This builds up students' knowledge, and enhances their ability to apply it to new situations which they will encounter upon entering the industry
- To induce/orient students towards the information security course by preparing them to understand security threats to electronic commerce and their solution
- To teach students to follow proper standards when tackling problems and proposing and documenting solutions, thus ensuring that they can be understood and enforced. This helps to promote responsibility and a professional attitude in students' minds

NOTE: Students will be encouraged to consider real life situations and should be asked to discuss a security issue. Students will be provided significant freedom of choice with respect to strategies and techniques, thus promoting creativity. The course on Information Systems Security is a complementary course to this and must be made compulsory in the same semester where this course is offered to students.

This document contains:

- Syllabus topic
- List of Books : Reference Books and Text Book
- List of URLs for useful articles/documents/presentations to visit on the Internet

Topic Sr. No.	Topic Name	Lectures
1.	Introduction to Electronic Commerce/Overview of Electronic commerce <ol style="list-style-type: none">1. Definition of Electronic Commerce/what is Electronic Commerce2. Impact of Electronic Commerce on the Value Chain3. The eCommerce framework4. Anatomy of eCommerce applications5. Consumer and organization applications of eCommerce	5
2	The Internet as the back-bone for Electronic Commerce	

	<ul style="list-style-type: none"> • Internet Terminology • History of Internet development • Internet Governance in the net-centric digital economy • Overview of Internet Applications 	5
	Electronic Commerce and the Word Wide Web	
	<ul style="list-style-type: none"> • Architectural Framework for Electronic Commerce\ • WWW as the architecture • Technology behind the Worldwide Web 	
3	Electronic Commerce Marketing concepts	
	<ul style="list-style-type: none"> • Online consumer behaviour • Online Marketing, Direct Marketing • Consumer Psychology considerations in electronic commerce • Privacy considerations • Online Profile building of consumer 	4
4	Building an electronic commerce website	3
	<ul style="list-style-type: none"> • Up time/Down time considerations • Web site accessibility considerations etc. 	
5	The role of Internet Service Providers (ISPs) in electronic Commerce (Local ISPs, National ISPs, regional ISPs) connectivity options	3
6	Network Security and Firewalls, Encryption, Cryptography and Authentication	3
7	Electronic Payment Systems	
	The PCI-DSS (Payment Card Industry – Data Security Standard)	3
8	Electronic Commerce and EDI (Electronic Data Interchange)	3
9	Role of Software Agents in Electronic Commerce	
	<ul style="list-style-type: none"> • History of Software Agents • Characteristics and Properties of Software Agents 	3
10	Internet Protocol Suite	2
11	Mobile and Wireless Computing Fundamentals	2
12	Legal Issues in Electronic Commerce	
	<ul style="list-style-type: none"> • Global contracts • Domain name registration and cyber squatting crimes • Negative campaigning • Deeply linked sites 	2
13	Auditing Electronic Commerce Applications	2

List of Text Books

Recommended Usage type: Ref = Reference Book and Txt = Text Book

NOTE: Indicated prices are the last known prices. They may be subject to change depending on prevailing market conditions

Sr. No.	Title of the Book	Use	Author & (Publisher)	Price
1	Frontiers of Electronic Commerce	Txt	Kalakota Ravi & Whinston Andrew B. Pearson Education Asia [Low Priced Edition]	Rs. 325/-
2	E-commerce	Txt	Kenneth C. Laudon and Carol G. Traver ISBN 81-297-0112-X	Rs. 350/-
3	Electronic Commerce: Security, Risk Management and Control	Ref	Marilyn Greenstein and Todd M. Feinman (Irwin- McGraw-Hill) ISBN 0-07-116319-0	
4	Electronic Commerce Technology	Ref	Schneider, Gary, and James Perry Thomson Learning (ISBN 0-7600-1179-6)	
5	The E-business (R)Evolution	Ref	Daniel Armor (Pearson Education India) ISBN 981-405-826-2	\$ 9/-
6	Indian Laws of eBusiness		Rajesh Talwar	Rs. 250/-
7	Mobile and Wireless Design Essentials	Ref	Martyn Mallick (Wiley-dreamtech India Pvt. Ltd.) ISBN 81-265-0354-8	Rs. 329/-
8	Principles of Mobile Computing	Ref	Uwe Hansmann, Lothar Merk, Martin S. Nicklous et al (Springer) Sold by Wiley-dreamtech India Pvt. Ltd. ISBN 81-7722-468-9	Rs. 349/-
9	Handbook of Research on Mobile Business Technical, Methodological, and Social Perspectives		Edited by Dr. Bhuvan Unhelkar (IDEA Group, USA, Publication) ISBN: 1-59140-817-2	US \$350.00 US \$280.00**Online Access Only
10	Mobile Commerce :	Ref	Paul May	\$ 39.00

Opportunities,
Applications, and
Technologies of
Wireless Business

(Cambridge
University Press)
ISBN 0-521-79756-X

SEMESTER 2

Data Structures And Algorithms [201]

All coding is to be done in ANSI 'C'. Emphasis should be laid on the algorithmic features of various data structures.

1. Data Structure Concepts : Definition of Data Structure, precondition, Examples of data structures. Kinds of data structures, logical Implementation and Application levels of data structures. Node and Representative node of data structure, Empty data structure. Mathematical Structure, hardware Structure and Storage structure. Abstract Data Type (ADT) vis-à-vis data structure. [01]

2 Algorithm Concepts: Algorithmics, Concept of a well posed problem, Definition of Algorithm. Recursive and iterative algorithms, Objectives of algorithmics. Quality of an algorithm, Space complexity and Time complexity of algorithm, Frequency Analysis and Problem complexity. [01]

3 Arrays: Characteristics of an array. Definition of an Array, Positional value of a member, Base address of array, Indexing of an array, Index variable, Index type. Implementation of 1-D arrays, Row and Column Major implementations of 2-D, 3-D and n-D arrays. Simple examples illustrating address computations. Feature restricting the number of array implementations to two. [03]

4 Stacks: Stack as a data structure, Relationship component (LIFO) in stacks. Representative node for stack, uses of stack. Static and Dynamic stack. PUSH and POP operations for stack. ANSI 'C' implementations of PUSH and POP operations for stacks implemented as array and linked list. Algorithm for comparing static and dynamic stacks. Polish and reverse Polish notations. ANSI 'C' implementations of PUSH and POP operations for stacks implemented as array and linked list. Algorithm for comparing static and dynamic stacks. Polish and Reverse Polish Notations. ANSI "C" implementation of stack based algorithms for (a) Validating an expression for any mismatch of brackets, braces and parenthesis, (b) Converting an infix form to postfix form, (c) Conversion of an infix form to its prefix form, (d) Evaluation of a postfix form and (e) Evaluation of a prefix form. Simulation of recursion using stacks, stacks and nested calls. [06]

5 Queues : Queue as data structure, Relationship component (FIFO) Queue. Representative nodes (Front and Rear) for queue. Classification of queue as Linear Queue, (b) Circular Queue (c) Priority Queue. ANSI 'C' Implementations of algorithms for (a) Adding a node in queue, (b) Deleting a Node form queue Finding size of queue and (d) printing a queue, for linear And circular queues expressed as array and list. Dangling Pointer and Dynamic Queue. List implementation of PRIORITY QUEUE, Priority queue as a sorted list. ANSI 'C' algorithm for converting a dynamic stack into a dynamic queue and vice-versa, Concept of Double Ended Queue -DEQUE, Input Restricted DEQue (IRD), Output Restricted DEQUE (ORD). Comparison of add node

and delete node operations on different linear non recursive data structures viz. Stack, Queue, DEQUE, IRD and ORD, use of queue in multiuser OS like UNIX [05]

6 Linked Lists: Concept of a Linked List as a run time equivalent of array. List versus array. Classification of a node as Atomic and List node. Internal pointer and External Pointer. Head and Tail of a list. NULL list, Length of a list. Classification of lists based on the number of internal pointers in a list node - Single and Double lists. Classification of lists based on the kind of collection - Linear list and Circular list. Linear Single List (LSL), Circular Single List (CSL), Linear Double List (LDL) and Circular Double List (CDL). ANSI 'C' algorithms for (a) Adding a node in a list, (b) Deleting a node from a list, (c) Finding length of a list and (d) Printing of a list for LSL, CSL, LDL and CDL. ANSI 'C' algorithms for (a) Sorting a LSL, (b) Creating a sorted LSL and (c) Merging of two sorted LSL. Use of LSL as a SET. Abstract representation of a list using bracket notation. Simple Linked List. Generalised Linked List with simple examples. Simple and Generalised sublists. Shared List, Shared list vis-à-vis sublist. Recursive list, Recursive list as circular and non-circular list, Recursive list as a shared list. Concept of Multilist List, Uses of Multilist Lists. ANSI 'C' algorithms for (a) Converting LSL to CSL and vice-versa and (b) LDL to CDL and vice-versa. [06]

7 Trees : Concept of a Tree and Subtree. Tree as a recursive data structure. Representative node of tree (Root). Concept of a n-ary tree and Binary tree. Definitions of n-ary and 2-ary trees. 2-ary tree as Binary Tree, NULL tree. Definitions of Root, Father Node, Subtree, Left Subtree, Right Subtree, Son Node, Youngest Son Node, Brother Nodes, Ancestor Node, Descendent Node, Left Descendent Node, External Node, Weight of a tree, Level of a node, Height/Depth of a Tree. AVL Trees. Balance of a node, Weight Balanced Trees. Strictly Binary Tree, Complete Binary Tree of depth "d". Features of a complete binary tree. Almost complete binary tree of depth "d". Derivation of expression relating number of nodes of a complete binary tree with the depth of complete binary tree. Concept of an Ordered Tree. Binary Search Tree (BST), ANSI 'C' implementations of algorithms for (a) Adding a node in BST, (b) Deleting a node from BST, (c) Finding total number of nodes in a BST, (d) Finding total number of leaf nodes in a BST, (e) finding total number of nonleaf nodes in a BST. Concept of Tree Traversal - Inorder, Preorder and Postorder traversals of BST. ANSI 'C' implementations of algorithms for inorder, preorder and postorder tree traversals. "C" Algorithm for printing tree nodes in descending order. ANSI 'C' algorithms for (a) Creating a copy of any given BST and (b) Creating mirror image of any given BST. Representation of a simple BST as an array. Binary tree node and double list node. 'C' algorithms for (a) Level order traversal of a BST using linear queue and (b) Nonrecursive inorder traversal of any BST using stack. Concept of a Thread, Threaded binary trees, Left Threaded and Right Threaded binary search trees. Creation and inorder traversal algorithms for right threaded binary trees. Applications of trees in spellcheck software and publishing industry. Technique for converting a n-ary tree into a 2-ary tree. Huffman Algorithm, Symbol and Frequency Count of symbol. Huffman Tree, Features of a Huffman tree.

[06]

8 Sorting Algorithms : ANSI 'C' implementations for Bubble Sort, Insertion Sort, Quick Sort and Heap Sort for both ascending and descending order sorting. [02]

9 Search Algorithms : ANSI 'C' implementations of algorithms for Linear Search and Binary Search. [01]

10 Symbol Tables : Definition of a Symbol Table, Applications of Symbol Tables, Objectives of maintaining a symbol table. Static symbol table, Dynamic symbol table. Criterion for the selection of a storage pattern for symbol tables, AVL trees as builtin symbol tables, Inherent advantages and disadvantages of builtin symbol tables. User defined symbol Table, Concept of 1-D array as a user defined symbol table. Key of a symbol, Bucket, Bucket size, Key to address function - Hashing Function. HASH TABLE, Synonyms, Home address of a symbol, Collision, Bucket Overflow, Static and Dynamic techniques for extending bucket size for storing synonyms. Disadvantages of static technique. Chaining of synonyms through dynamic technique, Use of unsorted and sorted linear linked lists of keys in chaining. Disadvantage of using lists in chaining. Ideal Hash Table, Ideal Hashing Function - MINIMAL. Ideal user defined symbol table as a combination of 1-D array and AVL trees. ANSI 'C' implementation of simple hashing functions (a) Division Method, (b) Folding and (c) midquaring. [02]

11 Graphs : Concepts of Point/vertex and Edge/arc, Adjacent vertices. Sets of vertices and edges. Definition of a graph of "n" vertices, Directed and Undirected edges and their representations. Directed and Undirected graphs and their representations, DIGRAPH and directed graph. Definitions of Incidence of a graph, Adjacent vertices, Multigraph, Adjacent to, Adjacent from, Degree of a vertex, Indegree of a vertex in directed graph, Outdegree of a vertex, Total degree of a vertex in DIGRAPH, Maximum number of edges for undirected graph of "n" vertices, Complete Graph, Maximum number of edges in a DIGRAPH of "n" vertices, Complete DIGRAPH, Subgraph, path, and Adjacent vertices, Connected vertices, Connected graph, Connected vis-à-vis complete graph, Strongly Connected Graph, Strongly connected graph vis-à-vis complete DIGRAPH, Simple path, cycle, Cyclic graph, Acyclic graph, Directed Acyclic Graph - DAG. Description of tree as a graph. Adjacency matrix and adjacency list representations for directed and undirected graphs. Conclusions of graph features from its matrix and list forms. Reverse adjacency lists for DIGRAPH. Adjacency Multilist List representations of undirected and directed graphs. Concept of a Graph Search. Breadth First Search (BFS) and Depth First Search (DFS) for a graph. ANSI 'C' implementations of Breadth First Search and Depth First Search algorithms. Relationships between tree traversal algorithms and tree search algorithms. Concepts of a Weighted Edge and Weighted Graph. Representations of undirected and directed weighted graphs. Cost Matrix for weighted graph. Weighted Adjacency matrix for weighted graph. Concept of a network, fields of applications of GRAPH. [07]

Books recommended :

Data Structures Using "C"

by Tanenbaum.

Data Structures and Program Design in "C"

by Robert L. Kruse.

Fundamentals of Data Structures

by Horowitz and Sahani.

Data Structures : An Advanced Approach Using 'C'

by Esakov and Weises.

Data Structures and 'C' Programming

by Cristopher J. Vanwyk.

DATA BASE MANAGEMENT SYSTEM [202]

1 Introduction

- 1.1 History : Advantages and limitations of DBMS; Users of DBMS,
- 1.2 Software Modules in DBMS; Architecture of DBMS. (02)

2 Modeling Techniques

- 2.1 Different Types of Models, Introduction to ERD. (07)

3 Hierarchical Database

- 3.1 Introduction. (01)

4 Network Database

- 4.1 Introduction (01)

5. Relational Algebra

- 5.1 Select,Project,Union,Intersection, Difference,Cartesian Product, Simple Join.
Queries to be solved based on the above. (03)

6. Relational Database

- 6.1 Introduction; Codd's 12 Rules; Concept of Domain, Tuple,
cardinality; Comparison between HDB-NDB-RDB (04)

7 Normalisation

- 7.1 Advantages and disadvantages of Normalisation; 1NF-2NF-3NF-
rules with examples; Anomalies. (04)

8 Integrity Constraints

- 8.1 Entity-Domain-Referential integrity rules; Assertion and
Triggers concept. (04)

9 Recovery Mechanisms

- 9.1 Recovery from various problems of volatile and non-volatile
storage devices; Concept-properties-states of Transaction;
Introduction to mechanisms such as - Log, Checkpoint and
Shadow Paging. (03)

10 Concurrency Controls

- 10.1 Problems of concurrent Transactions; Control Mechanisms such
as - Locks, Time-Stamps, Optimistic Scheduling and MVT. (03)

11 Distributed Databases

- 11.1 Concepts, Data Distributions Techniques. (02)

12. Data Warehousing and Data Mining

(03)

12.1 Concept, Architecture, Various tools in Data Warehousing, Tools in Data Mining, Difference between Data mining and normal query.

SQL commands.

List of SQL commands to be covered (03)
Create/drop a Database
Create /Modify/Alter/Drop Table
DML Commands
Insert
Update
Delete
Select
Aggregate Function
Max
Min
Avg
Count
Sum
GROUP BY
ORDER BY
HAVING

Books Recommended:

- *Introduction To Database Systems.* By C.J.Date
- *Data Base System Concept.* By Korth.
- *Data Management Systems* By Alexis Leon, Mathew Leon
- *Principals of Database Management* By James Martin.
- *Computer Database Organization* By James Martin.
- *Relational database design for Micro Computers applications* Prentice Hall (Jackson)
- *Introduction to Data Management Systems* By Atul Kahate
- *Fundamentals of Database Systems* By Elmasri, Navathe

ORACLE [203]

- Queries (3)
 - Select with all options
 - Operators
 - Arithmetic
 - Comparison
 - Logical (in, between, like, all, %, _, any, exists, is null, and ,or, not, Distinct)
 - Order by clause
- SQL Functions (4)
 - Date
 - Sys_date , next_day, Add_months, last_day, months_between,
 - Numeric
 - round, trunc, abs, ceil, cos, exp, floor
 - Character
 - initcap, lower, upper, ltrim, rtrim, translate, length, lpad, rpad, replace
 - Conversion
 - to_char, to_date, to_number
 - Miscellaneous
 - Uid, User, nvl, vsize, decode, rownum
 - Group function
 - avg, max, min, sum, count, with Group by and Having Clause
 - Nested functions
- Joins (2)
 - Simple join
 - Equi join
 - Non equi join
 - Self join
 - Outer join
 - Set operators (Union, union all, intersect, minus)
- Sub queries and Corelated query (2)
- DML statements (Insert, Update, Delete with where clause) (2)
- TCL (Commit, Rollback, Savepoint)
- Locks in Oracle
- DDL Statements
- Data types (1)
 - Character
 - Char, Varchar/varchar2, Long
 - Number
 - Number (p) - fixed point, Number (p,s) - floating point
 - Date
 - Raw
 - Long raw
 - Introduction to LOB datatypes (CLOB, BLOB, BFILE)
- Table (2)
 - Create, Alter, Drop, Truncate, Rename

Constraints (Primary key, Foreign Key, Unique Key, Check, Default, Not Null, On delete, Cascade)	
Column level and Table level constraints	
• Oracle Objects	(2)
Views, Sequences, Synonyms, Index (Define, Alter and Drop)	
• Introduction to Object Oriented Concepts	(2)
Object type and Methods	
• Introduction to Oracle Architecture	(1)
• Introduction to Report writing using SQL	(1)
(Title, Btitle, skip, set, pause, column, sql.pno, Break on, compute sum, set server output on.)	
• Creating Users and assigning privileges	(1)
• PL / SQL	(9)
Introduction to PL/SQL	
Advantages of PL/SQL	
PL/SQL Character Set	
Data types	
Character, Raw, rowid, boolean, binary_integer, number, Variable, constant	
PL/SQL blocks	
Attribute - %type, %rowtype	
operators function comparison, numeric, character, date	
control structure	
sequential - goto	
Error handling	
concept of exception	
pre defined exceptions -no_data_found, cursor_allready_open, dup_val_on_index, storage_error, program_error, zero_divide, invalid_cursor, login_denied, invalid_number, too_many_rows, dbms_output, user_defined exceptions	
Cursor	
Explicit & implicit Cursor, Cursor for loop, Parametric cursor, Declaring cursor variables, Constrained and unconstrained cursor variables, Opening a cursor variable from a query, Closing cursor variables, Restrictions using cursor variables	
Composite Datatypes	
Record, Declaration, refer, record assignment	
Table declaration, table attributes (count, delete, exists, first, last, next, prior)	
• Database Triggers	(2)
Types of Triggers	
Enabling, disabling	
Predicates- inserting, updating, deleting	
• Procedures and Functions	(2)
Definition, Implementation and Execution	
• Packages	(2)

- Introduction to Oracle 9i

(2)

Books Recommended :

SQL – The complete Reference by Groff James & Weinberg Paul.
SQL for Professionals by Kishore Swapna & Naik Rajesh
SQL from the ground up by Pyofinch Mary
SQL Unleashed by Ladanyi Hans
Oracle 7 by Ivan Byross
Understanding SQL by Gruber Martin
Teach yourself SQL in 14 days by Morgan Bryan & Perkins Jeff
Oracle PL/SQL Programming by Scott Urman
Teach yourself PL/SQL in 21 days by Lucas Tom

Basic JAVA [204]

1	Introduction to JAVA	2
	-History of Java	
	-Features of Java	
	-JDK Environment	
	-The Java Virtual Machine	
	-Garbage Collection	
2	Programming Concepts of Basic Java	6
	-Identifiers and Keywords	
	-Data Types in Java	
	-Java coding Conventions	
	-Expressions in Java	
	-Control structures, decision making statements	
	-Arrays and its methods	
3	Objects and Classes	10
	-Object Fundamentals	
	-Pass by value	
	-‘this’ reference	
	-Data hiding and encapsulation	
	-Overloading	
	-Overriding	
	-Constructors	
	-Finalization	
	-Subclasses (Inheritance)	
	-Relationship between super class object and subclass object	
	-implicit subclass object to super class object Conversion	
	-Dynamic method dispatch	
4	Language Features	10
	-scope rules	
	-static data, static methods, static blocks	
	-all modifiers of class, method, data members and variable	
	-Abstract Classes	
	-Interfaces	
	-Inner classes	
	-Wrapper Classes	
	-packages	
	-Package access	
	-importing packages and classes	
	-user define packages	
5	Exception Handling	3
	-Types of Exceptions	
	-try, catch, finally, throws keywords	
	-creating your own exception	

	-exceptions and Inheritance	
6	Multithreading	5
	-Multithreading Concept	
	-Thread Life Cycle	
	-Creating multithreading Application	
	-Thread Priorities	
	-Thread synchronization	
7	Abstract Window Toolkit	12
	-Components and Graphics	
	-Containers, Frames and Panels	
	-Layout Managers	
	-Border Layout	
	-Flow Layout	
	-Grid Layout	
	- Card Layout	
	-AWT all Components	
	-Event Delegation Model	
	-Event Source and Handlers	
	-Event Categories, Listeners, adapters	
	-Anonymous Classes	
	-Applets	
	-Applet Life Cycle	
	-Applet Context	
	-Inter applet communication	
8	Java utility Packages , classes, Interfaces	6
	HashTable	
	Vector	
	Priorities	
	Math	
	Random	
	System	
	String	
	StringBuffer	
	Map	
	Enumeration	
9	Streams and File IO	6
	-Files and Stream	
	-Stream classes	
	-Reader Writer classes	
	-File class Tests and Utilities	
	-Serialization and de serialization	

Note : % of marks is just guideline to the paper setters. The paper setters may or may not use these guidelines.

Author	Title	Publisher and Address
Cay S Horstmann Gary Cornell	<i>Core JAVA 2 Vol-1 & Vol-2</i>	The Sun Micro Systems Press, New Delhi
Jerry R Jackson Alan L. McClellan Peter Van der Liden	<i>Java by Example 1.2 Just Java</i>	The Sun Micro Systems Press, New Delhi The Sun Micro Systems Press, New Delhi
Peter Van der Liden	<i>Not Just Java</i>	The Sun Micro Systems Press, New Delhi
Jaffry A Borrer	<i>OOP with Java An ultimate Tutorial</i>	The Sun Micro Systems Press, New Delhi
E. Balguruswamy	<i>Programming with java, A Primer</i>	The Sun Micro Systems Press, New Delhi
Deitel and Deitel	<i>Java How to Program</i>	Prentice Hall Upper Saddle River, New Jersey 07458 (US)

**The practical should cover minimum 100 programs.

**The practical term work should be done by the student. The print out of the programs should be kept in Term work file.

CORE RUBY [204]

Fundamentals– What is Ruby; Ruby download and installation; irb and SciTE; Free format; Case sensitive; Comments; Statement delimiters; Documentation; Operators (with precedence and associativity rules); Ruby editors; .rb file; Concept of an object and that everything is an object in Ruby; Object class and its methods; Usage of puts, gets methods; Ruby conventions; Garbage collection (3 lectures)

Variables and Constants– Name characters; Variables – local, instance, class, global; Constants naming, rules and concept of scope operator ::; Naming conventions; Dynamically typed; Usage of method type (2 lectures)

Numbers– Concept and usage with Class Numeric, Float, Integer, Fixnum and Bignum (1 lecture)

Strings– String literals using single- and double-quotes and their differences; Usage of #{expression}; Conversions using .to_i, .to_f, .to_s; Usage of <<; Concept of symbols; Class String methods like chomp, reverse, length, upcase, downcase, swapcase, capitalize, strip, length, index, slice, upcase!, downcase!, swapcase! and capitalize!. (4 lectures)

Random Numbers– rand method (1 lecture)

Arrays– Concept; Class Array methods like delete, sort, length and each using do end (2 lectures)

Concept of Ranges and Hashes (2 lecture)

Constructs– if else end elsif; while end; case when end (1 lecture)

Regular Expressions– Simple examples (2 lectures)

Methods– Writing own methods using def end; class and instance methods (with getter and setter); return and concept of value returned by last statement in a method; variable number of parameters using * (3 lectures)

Code Blocks– Using do end and { }; Usage of yield method; Concept of Proc and it's method call; lambda (3 lectures)

File I/O– File class and its method open (3 lectures)

Writing a class– Standard class Class; initialize; new methods; Access modifiers private and protected; Usage of attr_reader, attr_writer, attr_accessor; Concept of inheritance and using <; Using super (4 lectures)

Concept of Duck Typing (1 lecture)

Modules – Examples of writing a module; Usage of require and include; Concept of mix-ins (1 lecture)

Exception handling– Exception class and its hierarchy; begin rescue ensure end;

(2 lectures)

Concept of Unit Testing

(2 lectures)

Standard Classes and Modules– Usage of Dir, Time, Thread, Range, IO, Module, GC, Kernel, Math – usage (3 lectures)

Recommended Books:

- a. Programming Ruby by Dave Thomas
- b. Learn to Program by Chris Pine
- c. Ruby For Rails by David Black
- d. Beginning Ruby by Peter Cooper

Object Oriented Designing [205]
OBJECT ORIENTED PROGRAMMING USING C++

Course Objectives : By the end of the course students will be able to:

- Write C++ programs using the more esoteric language features.
- Utilise OO techniques to design C++ programs.
- Use the standard C++ library.
- Exploit advanced C++ techniques

Sr. No	<u>Chapter details</u>	Lectures
1.	Principle of OOP's	2
	Introduction Procedural Vs Object Oriented Programming Classes Object Data Abstraction Encapsulation Inheritance Polymorphism Dynamic Binding Message Passing Object Oriented Languages Object Based languages	
2.	Basics of C++	1
	A Brief History of C & C++ C Vs C++ A Simple C++ Program Application of C++ Structure & Class Compiling & Linking	
3.	Expression	2
	Tokens, Keywords Identifiers & Constants , Basic Data Types, User-Defined Data Types Symbolic Constant Type Compatibility Reference Variables Operator in C++ Scope Resolution Operator Member Dereferencing Operators Memory Management Operators Manipulators Type Cast Operator	
4.	Functions In C++	2

	The Main Function, Function Prototyping Call by Reference, Call by Address, Call by Value, Return by Reference Inline Function, Default Arguments Const Arguments, Function Overloading Friend Function	
5.	Classes & Object	4
	A Sample C++ Program with class Defining Member Functions Making an Outside Function Inline Nesting of Member Functions Private Member Functions Arrays within a Class Memory Allocation for Objects Static Data Members, Static Member Functions, Arrays of Objects Object as Function Arguments Friendly Functions, Returning Objects, Const member functions Pointer to Members, Local Classes	
6.	Constructor & Destructor	2
	Constructor Parameterized Constructor Multiple Constructor in a Class Constructors with Default Arguments Dynamic Initialization of Objects Copy Constructor Dynamic Constructor Const Object Destructor	
7.	Operator Overloading & Type Conversion	3
	Defining operator Overloading Overloading Unary Operator Overloading Binary Operator Overloading Binary Operator Using Friends Manipulating of String Using Operators Type Conversion Rules for Overloading Operators	
8.	Inheritance	3
	Defining Derived Classes Single Inheritance Making a Private Member Inheritable Multilevel Inheritance Hierarchical Inheritance Multiple Inheritance, Hybrid Inheritance Virtual Base Classes, Abstract Classes	

	Constructor in Derived Classes Nesting of Classes	
9.	Pointer, Virtual Function & Polymorphism	3
	Introduction Pointer to Object, This pointer Pointer to Derived Class, Virtual Function Pure Virtual Function, Early Vs Late Binding	
10.	The C++ I/O System Basics	2
	C++ Streams, C++ Stream Classes Unformatted I/O Operation Formatted I/O Operation Managing Output with Manipulators	
11.	Working with Files	3
	Introduction Classes for File Stream Operation Opening & Closing Files Detection of End of File More about Open(): File modes File pointer & manipulator Sequential Input & output Operation Updating a File : Random Access Command Line Arguments	
12.	Template	2
	Generic Function A function with Two Generic Data Types Explicitly Overloading a Generic Function Overloading a Function Template Using Standard Parameter with Template Functions Generic Function Restriction Applying Generic Function : Generic Sort Generic Classes An Example with Two Generic Data Types Using Non-Type Arguments with Generic Class, Using Default Arguments With Template Classes, Explicit Class Specification, The typename & export keywords	
13.	Exception handling	2
	Exception Handling Fundamentals The try Block, the catch Exception Handler The throw Statements The try/throw/catch sequence Exception Specification Unexpected Exception Catch – All Exception Handlers Throwing an exception from handler Uncaught Exception	

14.	Introduction to Standard Template Library	2
	STL Programming Model, Sequence Container Adapter, Integrator Algorithms, Predicates, Allocators	
15.	Namespace	2
	Introducing Namespaces Referring to Members of a Namespace The using namespace Statement Defining A Namespaces Nested Namespaces Unnamed Namespaces Namespace Aliases	
16.	New Style Casts & RTTI	2
	New-Style Casts, dynamic_cast static_cast ,reinterpret_cast const_cast, Runtime Type Information (RTTI), A Simple Application of Run-Time Type ID, Ttypeid Can be Applied to Template Classes	

Reference :

- 1.C++ : The Complete Reference by Herbert Schildt
- 2.Let us C++ By Kanetkar
- 3.Object Oriented Programming with C++ : E. Balagurusamy
- 4.C++ Primer : Stanley Lippman & Lajoi
- 5.C++ Programming Language : Bjarne Stroustrup
- 6.C++ Programming Bible : Al Stevens & Clayton Walnum

SEMESTER 3

Linux Programming[301]

- 1 LINUX OPERATING SYSTEMS 10**
- Linux Operating System Concepts and Architecture
Overview of the Linux Kernel, User Space, Kernel Space,
Processes and Daemons, Process Control
Overview of Linux Administration
Linux Filesystem, User, Group and Resource Management
Configuration Files Overview
Filesystem Permissions, Access Permissions and Security,
Common Filesystem Commands,
Recursion Option in Commands , Find, Grep, Cat,
More, Less and Sort Commands
- Installation, Partitioning and Disk Management, Disk Naming,
Planning the Disk Partitioning Scheme, Disk Management Practices,
- Installing and Selecting Software, Selecting Services for Startup,
Configuration
Utilities, Updating Software and Package Management
System Startup, Shutdown and Reboot
System Boot Process Runlevels, Rc.d and init.d Directories,
Startup Scripts, PS Command Options, Top, and Nice/renice
Inetd/Xinetd Superdaemon, Restarting Services After Configuration
Changes
Terminating Process, Init Command, Shutdown Command
- Data Backup, Restore and Disaster Recovery
Backup Considerations, Backup Types, Backup Utilities and Methods
Scripting Backup, Restoring Data, Booting with Rescue Disk
- 2 Apache Web Server 8**
- Linux distribution Apache Installation
Starting and stopping Web Server
Apache Configuration files
Apache Directives
Server Configuration
Directory level configuration: htaccess and <Directory>
Access Control
URL Pathnames
MIME types
CGI files
Automatic directory Indexing

	<ul style="list-style-type: none"> Authentication Log files Virtual Hosting <ul style="list-style-type: none"> IP Address Virtual Host Name Based Virtual Host Dynamic Virtual Hosting Server Side includes Apache GUI Configuration Tools “ comanche and linuxconf Web Server Security -SSL Apache Web Server Configuration files 	
3	<p>MYSQL DATABASE SERVER</p> <ul style="list-style-type: none"> Installation <ul style="list-style-type: none"> precompiled packages post installed configuration post installed troubleshooting MySQL Administration Commands <ul style="list-style-type: none"> myisamchk mysql mysqladmin mysqlbug mysqlimport mysqlshow Creating users and granting them permissions Creating databases Data types Creating a table Graphical tools 	10
4	<p>PHP PROGRAMMING</p> <ul style="list-style-type: none"> Obtaining, Installing and Configuring PHP Obtaining PHP Source Code Installing PHP from Binary Packages PHP and Security Considerations PHP Configuration Parameters and the php.ini File Language Options ,Register Globals and Security Resource Limits Parameters,Error Handling and Logging Parameters Data Handling Parameters , Paths and Directories, Dynamic Extensions, Checking Install with phpinfo Function. Introduction HTML/XHTML and HTTP Basics Review PHP and the Web Server Architecture Model Overview of PHP Capabilities CGI vs. Shared Object Model PHP HTML Embedding “ Tags and Syntax 	12

Simple PHP Script Example

PHP and HTTP Environment Variables

PHP Language Core

Variables, Constants and Data Types, and Operators

Decision Making , Flow Control and Loops

Arrays and Array Operations , Two-Dimensional and Multi-dimensional Arrays, Strings and String Operations

Functions, Function Declaration and Parameter Passing

Outputting Data & Include and Require Statements

File and Directory Access Operations

Error Handling and Reporting Considerations

Processing HTML Form Input from the User

Creating a Dynamic HTML Form with PHP

Login and Authenticating Users

Using GET, POST, SESSION, and COOKIE variables

Session Management and Variables

Working with Cookies, Sending Email

Object-oriented PHP: Classes and Constructors

Database Operations with PHP

Built-in Database Functions, Connecting to a MySQL Database

Selecting a Database, Building and Sending the Query to Database Engine, Retrieving Results & Retrieving, Updating and Inserting Data

Sample Database Routines and Code Segments, Logging Database Operations for Troubleshooting

Books Recommended :

- *The Complete reference Linux* " peterson " Tata McGraw Hill.
- *Beginning Linux Programming* " Wrox Press
- *Beginning PHP, Apache, MySQL Web Development*
- *Teach Yourself MySQL in 21 days* - Techmedia

BUSINESS APPLICATIONS [302]

Sales and Distribution	06
Sales Budgeting – Market segments / Customers / Products	
Customers Enquiry and preparation of Quotation	
Customer Order processing – from Order acknowledgement to dispatch and invoicing	
Pending Customer orders – follow up	
Sales Analysis	
Network of Sales outlet – Distributed Databases	
While explaining this application consider an organisation manufacturing multiple products with sales outlets spread across the country.	
Manufacturing	10
BOM processing with product configuration	
MPS	
Capacity Requirements Planning for Equipment, Manpower and Time	
MRP	
Production Planning – work order management – EOQ, EBQ	
Shop floor control – calculation of labour efficiency, productivity and equipment down – time analysis	
Material procurement – Indenting, Purchasing, Vendor analysis, supplier's Bill passig and receipt of material.	
Stock accounting and control – raw material, work-in-process and Finished goods	
Job / Product / WIP costing – std, FIFO, LIFO, Avg, Wtd. Avg	
Sub-contracting of work to outside vendors	
Financial Accounting	12
Accounting – General Ledger	
Balance Sheet, P&L , Schedules	
Trial Balance	
Journals / Day books	
Ratio / Expense analysis	
Account Receivable	
Account Payables	
Human Resource	12
Employee Database	
Recruitment	
Employee appraisal	
Employee training	
Leave accounting	
Payroll	
Salary calculation and reporting	
Income Tax calculation and reporting	
Loan accounting	
PF and gratuity	

Bonus, Ex-gratia, Incentive, Superannuation
Arrears calculation

BOOKS RECOMMENDED –

MIS by W.S. Jawadekar

MIS by Jerome Kanter

MIS by Gordon B. Davis

MIS by Laudon and Laudon

Marketing Management

by Philip Kotler

Fundamentals of Financial management

by Prasanna Chandra

Personnel management

by C. B. Mammoria

Human Resource and Personnel Management

by K Aswathapa

Production and Operations Management

by Mayer

Modern Production Management

by R V Badi

Note :- Figures to the right indicate no of lectures for the topic.

ADVANCE JAVA [303]

- 1. NetWorking** (5 lectures)
Networking basics, Socket, port, Proxy servers, Internet addressing and URL, java.net – networking classes and interfaces, Implementing TCP/IP based Server and Client. Classes to be covered Socket, ServerSocket, IPAddress, URL connections; Programs on chatting 1-1 & 1-M (Threading)
- 2. JDBC** (5 lectures)
Types of JDBC Drivers, Writing JDBC applications using select, insert, delete, update; Types of Statement objects (Statement, PreparedStatement and CallableStatement); ResultSet, ResultsetMetaData; Inserting and updating records, Connection Pooling.
- 3. RMI** (1 lecture)
Introduction of RMI & Architecture (No programming is expected)
- 4. Java Beans** (1 lecture)
Introduction to Java Bean
Rules for writing a Simple Bean
- 5. Java Naming Directory Interface API** (1 lecture)
Java Naming Directory Interface concept
- 6. Servlets** (12 lectures)
Student should know how to configure TOMCAT; directory structure for a web Application; Servlet API Overview; Writing and running Simple Servlet. Servlet Life Cycle,
GenericServlet and HttpServlet, ServletConfig & ServletContext; Writing servlet to Handle Get and Post Methods, Reading user request data; Writing thread safe servlets, Http Tunneling,
Concept of cookie, Reading and writing cookies; Need of Session Management. Types of Session management; Using HttpSession Object ; Servlet & JDBC
- 7. JSP** (12 lectures)
Why JSP? JSP Directives, writing simple JSP page; Scripting Elements; JSP Actions: JSP & Java Beans; JSP Actions: include, forward and plugin, Managing sessions using JSP; JSP & Databases;
Error Handling in JSP; Writing custom tags; **JSTL** – c, x, fmt, sql, fn, Expression Language, Implicit objects – (request, response, pageContext, session, application), Comments; Java Beans and JSP; Different scopes in a JSP page; Using JDBC in JSP; Study and Development of a Web Application and an Assignment. Tags c:out, c:set, c:if, c:catch, c:choose, c:when, c:otherwise, c:redirect, c:forEach, fmt:parseDate, fn:escapeXml, sql:query, sql:update
- 8. Introduction to Struts** (3 lectures)
(A Web Application Framework) – struts-config.xml; Understanding MVC architecture; *ActionServlet, ActionForm, ActionMapping, Action* classes.

Books Recommended :

Core Java Volume-I, Horstman and Cornell, Pearson Education
Core Java Volume-II, Horstman and Cornell, Pearson Education
Inside Servlets – Dustin R. Callway- Pearson Education
Developing Java Servlets – James Goodwill. Techmedia.

JSP Professional – Wrox Press

Java Server Programming – Volume I and II – Wrox Press

Java Tutorial Continued - Campione, Walrath, Humal and Tutrial Team –
Addison Wesley

The Complete Reference J2EE – Jim Keogh – Tata McGRAW Hill

SCWCD Exam Study kit – Hanumant Deshmukh

O'Reilly Book on Servlet and JSP

ADVANCE RUBY [303]

- **Socket Programming** [8]
 - Usage of TCPServer and TCPSocket Classes for Date and Time
 - Basic Networking
 - Port
 - Internet Addresses
 - Sockets
 - Socket classes
 - The Date Time Server and Client
- **Ruby/Tk** – Simple Ruby/Tk applications; Logger class [6]
- **WebServices** – Introduction [6]
- **Ruby with MySQL**– Introduction [6]
- **SMTP class**– An introduction [4]
- **Ruby on Rails** - An introduction [10]

Recommended Books:

Programming Ruby by Dave Thomas
Learn to Program by Chris Pine
Ruby For Rails by David Black
Beginning Ruby by Peter Cooper

VB.NET [304]

- 1. Introduction to VB.NET** (4 Lectures)
Event Driven Programming
.NET as better Programming Platform
.NET Framework
 NET Architecture
 The Just-In-Time Compiler
 1.3. NET Framework class library introduction
- 2. VB.NET Development Environment** (2 Lecture)
Creating Applications
Building Projects
Using simple components
Running VB.NET applications
- 3. Mastering VB Language** (3 Lectures)
Data, Operators, Conditionals and Loops.
Procedures, Error Handling, Classes and Objects.
- 4. Windows Applications in VB .NET.** (7 Lectures)
Windows Forms
Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons.
List Boxes, Combo Boxes. Picture Boxes, Scrollbars, Splitters, Timer
Menus, Built-in Dialogs
Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars.
- 5. Object Oriented Programming in VB .NET** (6 Lectures)
Class and Object
Properties, methods and events.
Constructors and Destructors
Method overloading
Inheritance
Access modifiers : Public, Private, Protected, Friend.
Overloading and Overriding.
Interfaces.
Polymorphism.
- 6. File handling** (4 Lectures)
File handling using FileStream, StreamWriter, StreamReader, BinaryReader, BinaryWriter classes.
File and Directory Classes
- 7. Databases in VB .NET** (8 Lectures)
Database : Connections, Data adapters, and datasets, Data Reader,
Connection to database with server explorer
Multiple Table Connection
Data binding with controls like Text Boxes, List Boxes, Data grid etc.
Navigating data source
Data Grid View, Data form wizard
Data validation
Connection Objects, Command Objects, Data Adapters, Dataset Class

8. Crystal Report

(6 Lectures)

Connection to Database, Table, Queries, Building Report, Modifying Report, Formatting Fields and Object

Header, Footer, Details, Group Header, Group footer, Summary

Working with formula fields, Parameter fields, Group, Special fields

Working with Multiple Tables, SQL in Crystal Report, Report Templates,

Books Recommended

- *Programming Microsoft Visual Basic.NET* – Francesco Balena
- *The Complete Reference -Visual Basic .NET* – Jeffrey R. Shapiro
- *Murach's VB.NET database programming with ADO.NET* -Anne Prince and Doug Lowe
- *The Visual Basic.NET COACH*
- *Visual Basic .NET 2003 in 21 Days.* – Steven Holzner, SAMS Publications.
- *Mastering Crystal Report* - BPB Publication
- *Crystal Report – The Complete Reference :-* Tata McGraw Hill

SOFTWARE PROJECT MANAGEMENT [305]

- Methodology must be case study oriented through out the syllabus.
- Faculty must design different cases and ask students to solve them(may be in groups) and do the proper assessment

1. Software Project Management, Concepts, Umbrella Activities under Software Project Management. (03)

1. Software Project Planning tools and techniques , Work breakdown Structure, Milestones, Software Sizing, Rayleigh curve etc.
Cost Estimation techniques like COCOMO, Function Point Analysis and other Cost Estimation methods. Time Estimation Tools like CPM/PERT, Gantt charts and other methods, COCOMO for time estimation etc. (Use of MS-PROJECT is recommended). (6)

3. Software Project Maintenance – Types, steps, Resource planning and estimation, Re-engineering the software products, Documentation standards, Version Control and Software Configuration Management. (6)

4. Software Quality Management, QC and QA, V & V Planning, tools and techniques(reviews, inspections, walkthroughs etc.), Software Quality parameters with their definitions, Introduction to ISO and CMM. (6)

5. Software Testing Techniques, test plans, Introduction to Manual testing and Automated testing tools. (3)

6. User Acceptance Testing and Implementation Planning, Steps, methods, Documentation etc. (3)

Software Risk Management – concepts, need, steps (3)

IT Management Functions – Resource Management, Overview of various functions, Requirements planning, sizing, benchmarking, documentation etc. (2)

Software and Hardware Acquisition Plan and standards (2)

IT-HR Management – Selection, retention, training, career path planning, various practices and controls necessary in HR Management. (2)

IT-Operations Management – Scheduling, roles and responsibilities, procedures, practices, standards etc. (2)

Performance Evaluation methods for Hardware, Software and Personnel. (2)

Books Recommended

- *Software Project Management* by Edwin Bennatan
- *Software Engineering* by Roger S Pressman
- *Software Engineering* by Martin L Shooman
- *TQM for Computer Software* by Dunn and Ullma
- *Management of Information Technology* by Pravin Mulay.
- *Software Project Management in Practice* by Pankaj Jalote
- *Software Project Management A concise study* by S A Kelkar

SEMESTER 4

Mobile Computing [401]

INTRODUCTION (8)

Medium access control - Telecommunication systems - Satellite systems - Broadcast systems.

STANDARDS (8)

Wireless LAN - IEEE 802.11 - HIPERLAN - Bluetooth.

ADHOC NETWORKS (8)

Characteristics - Performance issues - Routing in mobile hosts.

NETWORK ISSUES (8)

Mobile IP - DHCP - Mobile transport layer - Indirect TCP - Snooping TCP - Mobile TCP - Transmission / timeout freezing - Selective retransmission - Transaction oriented TCP.

APPLICATION ISSUES (8)

Wireless application protocol - Dynamic DNS - File systems - Synchronization protocol - Context-aware applications - Security - Analysis of existing wireless network .

Total No of periods: 40

References:

- 1. J. Schiller, Mobile Communications, Addison Wesley,2000.*
- 2. <http://www.bluetooth.com/>*
- 3. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley,1993.*

PROGRAM AND DESIGN WITH ASP.NET [402]

Upgrading ASP to ASP.NET

- ASP vs. ASP.NET
- Upgrading HTML Pages to ASP.NET
- Upgrading ASP Pages to ASP.NET

Creating Web Forms Applications

- Creating an ASP.NET Web Application Project
- Responding to Events
- Where Does Processing Occur?
- Namespace Fundamentals
- Maintaining State Information

Creating a User Interface

- Using Controls
- Validating Data
- Navigating Between Forms
- Navigation Between Pages

Data Binding

- Bind Data to the UI
- Transform and Filter Data

Storing and Retrieving Data with ADO.NET

- Accessing Data with ADO.NET
- Using Data Sets on Web Forms
- Processing Transactions

Catching and Correcting Errors

- Using Exception Handling
- Using Error Pages
- Logging Exceptions

Web Services

- Creating Web Services
- Discovering Web Services
- Instantiating and Invoking Web Services

Testing Web Applications

- Creating Tests
- Running Tests
- Debugging

Building and Deploying Web Applications

- Building a Web Application
- Deploying a Web Application
- Creating an Installation Program

Maintaining Security

- Authenticating and Authorizing Users
- Using Windows Authentication
- Using Forms Authentication

Books Recommended

- *Mastering ASP.Net* *BPB Publication*
- *ASP.net – The Complete Reference* *Tata McGraw Hill*
- *Active Server Pages 3.0 (in 21 days)* *by Techmedia*
- *Beginning Active Server Pages 3.0* *by Wrox Press*

Information Security [403]

Course Objectives

- To provide an overall understanding to the students about the importance of information systems security in the global context
- Explain the evolution of information systems and their role in globalization days
- To explain information security fundamentals, to explain physical security (which is often a neglected aspect of security)
- Physical and Logical Access Controls and their importance in businesses operations
- To provide an overview of network security, encryption and cryptographic techniques, firewalls and intrusion detection systems
- To explain application security (security of electronic mails, security of databases, security of operating systems)
- Mobile and Wireless security and Biometrics controls will be the new topics in this course
- To explain Security Architectures & Models, security Methodologies, Standards, and Frameworks and security metrics, (such as the ISO 27001, SSE-CMM, COBIT, COSO), and laws and legal frameworks for information systems security, to explain data privacy fundamentals. SOX and SAS 70 auditing standard is covered also
- The course also introduces security best practices whose awareness is important for students entering the I.T. industry and industries that are users of information systems because security is the emerging area now
- This course also introduces students to ethical issues involved in information systems security

NOTE: Students will be encouraged to consider real life situations involving information systems security. Students will be provided significant freedom of choice to choose their assignments. Colleges are encouraged to develop rapport with external agencies/vendors to arrange demos of security products. The course on Electronic Commerce is a complementary course to this and must be made compulsory in the same semester where this course is offered to students.

This document contains:

- Syllabus topic
- List of Books : Reference Books and Text Book
- List of URLs for useful articles/documents/presentations to visit on the Internet

Topic Sr. No.	Topic Name	Lectures
1.	Global information systems and their evolution, basics of information systems, role of the Internet and the World Wide Web	5
2	Understanding about the threats to information systems security	

	Building blocks of InfoSec, How Organizations manage security of their information systems	5
3	Information security risk analysis fundamentals	4
4	Importance of physical security and biometrics controls for protecting information systems assets	2
5	Security considerations for the mobile work force	4
6	Network security perspectives, networking and digital communications (overview only), security of wireless networks.	3
7	Cryptographic techniques and Encryption, Intrusion Detection Systems and Firewalls, security of virtual private networks	3
8	Security issues in application development with emphasis on integration of enterprise applications, database security, operating security and security of electronic mailing systems	5
9	Security models and frameworks and standards through introduction to the ISO 27001, SSE-CMM (systems security engineering – capability maturity model), COBIT (Control Objectives for Information and related technologies) and the Sarbanes-Oxley Act (SOX) and SAS 70 (statement on auditing standards)	3
10	Privacy Fundamentals, business practices’ impact on data privacy, technological impact on data privacy, privacy issues in web services and applications based on web services	3
11	Information security best practices – staffing, audits, disaster recovery planning and business continuity planning and asset management	3
	Ethical issues and intellectual property concerns for information security professionals – copy right, data protection etc. matters	3

List of Text Books

Recommended Usage type: Ref = Reference Book and Txt = Text Book

NOTE: Indicated prices are the last known prices. They may be subject to change depending on prevailing market conditions

Sr. No.	Title of the Book	Use	Author & (Publisher)	Price
1	Information Systems Security Management	Txt	Nina S. Godbole (Wiley India Pvt. Ltd.)	This is a flag ship book from Wiley India – a comprehensive book having 38 chapters, illustrative scenarios based on real life situations and ample appendices. It is developed by a highly qualified and industry

2	Security Engineering	Ref	Ross Anderson	experienced author who has extensively worked in the infosec and security audit domain. This is fundamental text for understanding security from engineering perspective
3	Information Security Management Handbook	Ref	Harold Tpton & Micki Krause (Auerbach Publications) 0-8493-1997-8/03	
4	Network Security Essentials: Applications and Standards		W. Stallings (Pearson Education) ISBN 0-13-016093-8	
5	Security Planning & Disaster Recovery	Ref	Eric Maiwald and William Sieglein (Tata McGraw-Hill) ISBN 0-07-049555-6	Rs. 295/-
6	Security Patterns: Integrating Security and Systems Engineering	Ref	Markus Schumacher, Eduardo Fernandez-Buglioni, Duane Hyberston et al (Wiley India Pvt. Ltd.) ISBN 81-265-0800-0	Rs. 449/-
7	eSecurity and You	Ref	Sandeep Oberoi (Tata McGraw-Hill) ISBN 0-07-040311-2	This is a good ref for legal issues in eSecurity

CYBER LAW [404]

- Access Control : Operating system Access Controls, Group and Roles, Access Control lists, Unix Operating System Security, Windows NT, Capabilities, Added Features in Windows 2000, Granularity, Sandboxing and Proof-carrying code, Hardware protection, Other technical Attacks. (8)
- Cryptography & PKI : Symmetric Cryptography, Asymmetric Cryptography, Keys, Hash Functions, Digital Signatures. (5)
- Distributed Systems - Concurrency, Fault Tolerance and Fault Recovery, Naming. (3)
- Multilevel and Multilateral Security : Multilevel Security, Multilateral Security (3)
- Electronic Banking –Banking and Bookkeeping. (2)
- Monitoring Systems –Introduction, Alarms, Prepayment Masters. (3)
- Biometrics : Physiological biometric techniques, behavioral biometric techniques, New biometric techniques, biometric systems. (3)
- 8. Incident Response : Incident Response, Prerequisites to planning an IRT. (3)
- 9.Network attack and Defence : Most Common Attacks, Scripts Kiddies and Packaged Defence. (4)
- 10.Management Issues : Organisational Issues, (2)
- 11.Protecting E-commerce Systems – Introduction (2)
- 12.Hacking – Introduction (2)

. At least two Case Studies on each topic.

BOOKS RECOMMENDED

- *Cyber Laws* – Singh Yatindra
- *Cyber Crime* – Bansal S K
- *Cyber law , E-commerce & M-Commerce* – Ahmand Tabrez
- *Handbook of Cyber and E-commerce laws* – Bakshi P M & Suri R K

Multimedia and Web Designing [405]

Suggestion for Replacement

SOFT SKILLS [405]

Objectives:

1. To encourage the all round development of students by focusing on soft skills.
2. To make student aware about the importance, the role and the content of soft skills through instruction, knowledge acquisition, and practice.
3. To develop and nurture the soft skills that help develop student as a team member, leader, and all round professional in long run have been identified and listed here for references. As the time professional in long run have been identified and listed here for references the time allotment for the soft skill laboratory as small and the fact that the skills are nurtured over years, students are encouraged to follow these skills as self study and self driven process.

Sr. No	Chapter Details	Sessions	Marks %	References
1	Self Development and Assessment 1.1 Self-Assessment 1.2 Self-Awareness, 1.3 Perception and Attitudes 1.4 Values and Belief System 1.5 Personal Goal Setting 1.6 Career Planning, 1.7 Self-Esteem, 1.8 Building of Self-Confidence	15	20	
2	Components of communication , Principles of communication barriers , listening skills Verbal Communication 2.1 Includes Planning 2.2 Preparation 2.3 Delivery, Feedback and Assessment of activities like a. Public speaking b. Group Discussion c. Oral Presentation skills, Perfect Interview d. Listening and observation skills, Body language 2.4 Use of Presentation graphics, 2.5 Use of Presentation aids, Study of communication.	15	10	

3	<p>Written Communication</p> <p>3.1 Technical Writing–Technical Reports</p> <p>3.2 Project Proposals,</p> <p>3.3 Brochures,</p> <p>3.4 Newsletters,</p> <p>3.5 Technical Articles</p> <p>3.6 Technical Manuals</p> <p>3.7 Official/Business Correspondence</p> <p>a. Business letters</p> <p>b. Memos</p> <p>c. Progress report, Minutes of meeting, Event reporting, Use of style, Grammar and Vocabulary for effective technical writing,</p> <p>d. Use of : Tools, Guidelines for technical writing, Publishing</p>	18	15	
4	<p>Ethics and Etiquettes</p> <p>4.1 Business Ethics</p> <p>4.2 Etiquettes in social as well as Office settings</p> <p>4.3 Email etiquettes</p> <p>4.4 Telephone Etiquettes</p> <p>4.5 Engineering ethics and ethics as an IT professional, Civic Sense.</p>	6	15	
5	<p>Other Skills</p> <p>5.1 Managing time</p> <p>5.2 Meditation</p> <p>5.3 Understanding roles of Engineer and their Responsibility</p> <p>5.4 Exposure to work environment And culture in today’s job Places</p> <p>5.5 Improving Personal Memory, Study skills that include Rapid reading, Notes taking, Complex problem solving, creativity.</p>	8	20	

References for students for self-improvement by self-study

Topic 1 : Any good book like

1. You Can Win – Shiv Khera – Macmillan Books – 2003 Revised Edition
2. 7 Habits of Highly effective people – Stephen Covey
3. Business Communication ? Asha Kaul
4. Business Communication - M. Balasubramanyam

Topic 2 and 3

1. John Collin, “Perfect Presentation”, Video Arts MARSHAL
2. Jenny Rogers “ Effective Interviews”, Video Arts MARSHAL
3. Raman Sharma, “ Technical Communications”, OXFORD
4. Sharon Gerson, Steven Gerson “Technical writing process and product”, Pearson Education Asia, LPE third edition.
5. R. Sharma, K. Mohan, Business correspondence and report writing”, TAG McGraw Hill ISBN 0-07-044555-9
6. Video for technical education catalog, National education and Information Films Ltd. Mumbai.
7. Management training and development catalog, National education and Information Films Ltd. Mumbai.
8. XEBEC, “Presentation Book 1,2,3”, Tata McGraw-Hill, 2000,ISBN 0-40221-3

Topic 4 and 5

1. Tim Hindle, “Reducing Stress”, Essential Manager series Dk Publishing
2. Sheila Cameron, “Business student Handbook”, Pitman Publishing
3. Dr. R. L. Bhatia, “ Managing time for competitive edge”
4. Lorayne Lucas “Memory Book”
5. Robert Heller, “Effective leadership”, Essential Manager series Dk Publishing
9. Newstrom Keith Davis,” Organizational Behavior”, Tata McGraw-Hill, 0-07-460358-2

It is proposed that expert from industry be invited to conduct lectures and workshops to understand the industry soft-skill requirement.

Guidelines for term-work : Marks 50

List Of Possible Assignments:

1. Write a personal essay and or resume or statement of purpose which may include:
 - Who am I (family background, past achievements, past activities of significance)
 - Strength and weakness (how to tackle them) (SWOT analysis)
 - Personal Short-term Goals, long term goals and action plan to achieve them

- Self assessment on soft-skills
- 2. Student could review and present to a group from the following ideas
 - Book review
 - Biographical Sketch
 - Any topic such as an inspirational story/personal values/beliefs/current topic
 - Ethics and etiquettes and social responsibilities as professional.
- 3 Student will present to a group from the following ideas
 - Multimedia based oral presentation on any topic of choice (Business/Technical)
 - Public speaking exercise in the form of debate or elocution on any topic of choice
- 4 Student will undergo two activities related to verbal/non-verbal skills from following
 - Appearing for mock personal interviews
 - Participating in group discussion on current affairs/Social Issue/ethics and etiquettes
 - Participating in games, role-playing exercises to highlight nonverbal skills.
- 5 Student will submit one technical document from the following:
 - Project proposal
 - Product brochure
 - Literature survey on any one topic
 - User Manual
 - Technical Help
- 6 Student will submit one business document from the following
 - A representative official correspondence
 - Minutes of meeting
 - Work progress report
- 7 Students will participate in one or two activities from following:
 - Team games for team building
 - Situational games fro role playing as leaders, members
 - Organizing mock events
 - Conducting meetings
- 8 Faculty may arrange one or more sessions from following :
 - Yoga and mediation
 - Stress management, relaxation exercises and fitness exercises
 - Time management and personal planning sessions
 - Improving memory skills
 - Improving leadership skills
 - Improving English conversation skills
 - Reading comprehension skills & notes taking skills
- 9. Students' own SWOT Analysis

Students are expected to keep a personal record of any six activities that they conduct in the soft skill laboratory in the form of a journal. All students need note to do the same assignments. Institute having a freedom within the framework to customize set of activities to be followed.

Assessment Guidelines for term-work assessment

1. Written Communications 20 marks
 - Students could submit for example
 - Personal resume, essay
 - Technical document or business document
2. Spoken communication 20 marks
 - One elocution event of say 8-10 minutes individually
 - One group discussion or group presentation event
3. Overall participation in soft skills based lab activities 10 marks
 - Attendance and enthusiasm
 - Participation and contribution in event management, organizing
 - Group games, group exercises, interpersonal skills observed
 - 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)

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 exercises. (2 sessions).
4. Group discussions could be done for groups of 5-8 students at a time for half 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)

Quality Control and Software Testing [406]

The relationship of software testing to quality is examined with an emphasis on testing techniques and the role of testing in the validation of system requirements. International Testing certifications such as the CSTE (Certified Software Test Engineer) from the QAI (Quality Assurance Institute) can be considered as the benchmark reference for this paper. However, this is optional. QAI may allow students without experience to write the CSTE certification exam – for that refer to www.softwarecertifications.org. (accessed 12th April 2008)

For understanding the CSTE pre-requisites, visits this link from the above mentioned site: http://www.softwarecertifications.org/qai_cste.htm (accessed 12th April 2008)

For online access to CSTE-CBOK (Common Body of Knowledge), visit this link <http://www.softwarecertifications.org/cstebok/cstebok.htm> (accessed 12th April 2008)

Soft skills in Communication, Negotiation, Conflict Handling and Stress Management are extremely essential for the tester given the cross functional/multi-team role he/she plays

in the industrial environment where mixed vendor/multiple vendor scenarios are common in today's outsourcing wave days. These skills go a long way in developing one's Leadership skills. Therefore, such soft skills should be provided as electives. Those are important for the overall development of testers.

Course Objectives

- To develop an engineering approach to testing of software applications/systems
- To develop and understanding of metrics in software testing projects
- To develop an ability to develop test cases and test scripts and cross functional ability to work with requirements specifications groups i.e. the systems analyst
- To develop and appreciation for complete test plan development
- To introduce the IEEE testing standards to students
- To provide and overview of configuration management tools along with hands-on practice sessions and to provide an opportunity to use at least one of the leading testing tool
- To understand risk based approach to software testing

This document contains:

- Syllabus topic
- List of Books : Reference Books and Text Book
- List of URLs for useful articles/documents/presentations to visit on the Internet

NOTE

Assumptions: this course is deeply linked with the

[1] Software Quality Assurance paper and the

[2] Paper that introduces students to the SDLC (systems development life cycle)

[3] Software Project Management Fundamentals

The assumption is that through either of those two courses, students are introduced to the topic of Configuration Management and Change Management.

Another assumption is that paper [1] paper [2] and paper [3] are taught either in the same semester as this paper or have already was completed before students take up this paper. With that considerations, the low weightages are indicated in the table below

Topic Sr. No.	Topic Name	Lectures
1.	Testing Fundamentals <ul style="list-style-type: none"> • QA (Quality Assurance) vis-à-vis QC (Quality Control) • V model of software testing and the testing work flow • Testing Techniques and Levels of Testing • Static versus Dynamic testing • Deliverables/artefacts generated from the testing phase of software project • Role of the Software Tester vis-a-via the project team 	4
2	Testing Methods & Techniques	

- Unit Testing
- Integration Testing
- Functional and System testing
 - Stress Testing
 - Performance Testing
 - Usability Testing
- Non-functional testing
- System Testing
- Acceptance Testing
- Regression Testing
- Beta Testing
- Black Box versus White Box Testing

6

Verification techniques such as the (code) Inspection, Walk-Through, Peer Reviews 2

Understanding the Test Environment. This includes understanding the following components of the testing environment: 2

- organization's policies & procedures
- culture, attitudes, rewards, test processes
- Stakeholders in software testing phase
- management's support of software testing, as well as any test labs developed for the purpose of testing software and multiple operating environments
- test tools, methods for developing and improving test processes

3

Test Design and Documentation

- Deriving effective test cases from requirements
- Bi-directional Traceability of test artefacts
- Handling test artefacts as 'living documents'

3

Understanding Testing Tools and Configuration 2

Management Tools

Understanding **Testing approaches** to different Types of Software Systems and applications

- Testing COTS (Commercial Off-the-Shelf Software)
- Web-based applications/Electronic Commerce applications
- Testing Data-Warehouse products
- Object-oriented systems
- Wirless/Mobile Computing applications
- Testing for Security
- Testing software components of third party
- Foreign Language testing
- Web-site testing

5

Developing **Risk based approach to testing** and understanding how Software test plans get developed

- Identifying business risks and risk contributors
- Learning to identify software risks

<ul style="list-style-type: none"> • Understanding Testing risks • Test scoping and Effort Estimating • Understanding Test Schedule 	4
Managing software testing projects and testing teams	2
<ul style="list-style-type: none"> • Test planning, scheduling and budgeting • Managing testing staff/resources • 	
Introduction to Defect Management	
<ul style="list-style-type: none"> • Defects, Errors and Bugs • Defect Tracking • Defect Reporting • Defect Metrics 	2
Introduction to Test Metrics and Measurements	2
Understanding Agile Testing and Xtreme Testing as approach to testing	1
Introduction to the TMM (Testing Maturity Model)	1
IEEE standards	1

List of Text Books

Recommended Usage type: Ref = Reference Book and Txt = Text Book

NOTE: Indicated prices are the last known prices. They may be subject to change depending on prevailing market conditions

Sr. No.	Title of the Book	Use	Author & (Publisher)	Price
1	Effective Methods for Software Testing	Txt	William E. Perry (Wiley – 3 rd Ed.)	
	Software Testing Fundamentals: Methods and Metrics	Ref.	Marnie Hutcheson (Wiley-dreamtech India Pvt. Ltd.) ISBN 81-265-0402-1	Rs. 255/-
	Effective Software Testing	Ref.	Elfriede Dustin (Pearson Education) ISBN 81-297-0048-4	Rs. 175/-
	Software Testing	Ref	Ron Patton (Techmedia) ISBN 81-7635-507-0	Rs. 450/-
	Software Quality Assurance: Principles and Practices	Ref	Nina Godbole (NAROSA Publication) ISBN 81-7319-550-1	Rs. 395/-
	Software Testing in the Real World: Improving the Process	Ref	Edward Kit (Pearson Education Low Prices Edition) ISBN 81-7808-147-4	Rs. 250/-

	Beta Testing for Better Software	Ref	Michael R. Fine (Wiley-dreamtech India Pvt. Ltd.) ISBN 81-265-0361-0	Rs. 300/-
	Testing Applications on the Web	Ref	Hung Q. Nguyen (Wiley) ISBN 0-471-394-70- X	

NETWORK TECHNOLOGY[407]

Basic Theory

(05)

Types of Networks
Peer-Peer Networks
Client/Server Networks
Host Terminal Network
Wireless Network
Wi-Fi Network
Virtual Private Network
Internet

Intranet Protocols

(05)

Network Protocols
TCP/IP (IP4 & IP6)
SPX/IPX
NETBEUI
Tunneling Protocols PPTP, L2TP,IP,SEC

Application Protocols

FTP, TELNET, HTTP, HTTPS

Mail Protocols

SMTP, POP, IMAP

Frame Formats & Standards

Ethernet 802.2, 802.3
Wireless 802.11a, 802.11g

b. Network Components

(03)

❖ Connectivity Components

- Connectors RG45, Cables CAT 5, CAT 5E, CAT 6
- Ethernet Cards, HUBS, Switches, Routers

❖ Modems

- Dial-up Modem , ISDN Modem
- DSL(Cable) Modem
- Using Ethernet Card for Accessing Internet

c. Topologies (Bus, Star, Ring and Wireless loop)

(02)

II Microsoft Network Technology

(10)

a. Features of Microsoft Windows Server 2003

Server Roles

File and print server

Web server and Mail server Web application services

Terminal server

Remote access and virtual private network(VPN) server

Directory services, Domain Name system(DNS), Dynamic Host Configuration Protocol(DHCP) server, and Windows Internet Naming Service(WINS)

b. Services

- ❖ Clustering Services
- ❖ Network load Balancing
- ❖ Security
- ❖ Common Language Runtime

- ❖ Internet Information Services(IIS 6.0)
- ❖ File and Print Services
- ❖ Active Directory
- ❖ Microsoft Software Update Services
- ❖ Storage Management
- ❖ Terminal Service
- ❖ Enterprise UDDI service
- ❖ Windows Media Services
- ❖ Microsoft .NET Framework
- ❖ Automated Deployment Service
- ❖ Windows Rights Management Service(RMS)
- ❖ Windows SharePoint Service

c.Features of various types of Servers

Standard Server
 Enterprise Server
 Data Center Server
 Web Server
 Small Business Server

d. Installation (10)

- ❖ Installing 2003 Server
- ❖ Server Application Installation
- ❖ Installing and Configuring terminal Server
- ❖ Remote Installation Services
- ❖ Implementing Active Directory and domain
- ❖ Implementing Group Policy
- ❖ Implementing Web services using IS
- ❖ Implementing Remote Access Services RADIUS Server
- ❖ Implementing Windows 2003 VPN
- ❖ Configuring Printer
- ❖ Configuring Backup
- ❖ Adding users to groups
- ❖ Configuring Firewall
- ❖ Configuring DHCP Server
- Building small office and home network using WIN XP and WIN 2000
- Installing .NET Frame on Clients

III. LINUX Network Technology (10)

a. Concepts

Linux File System and structure
 Default directories
 Network services
 http,https,ftp,nfs,BOOTTP,DHCP

b. Basic commands

- User Management
 - File Management
 - Process Management
 - Printer and Device Management
 - Network Management
 - Package Management
- c. Installation (10)
- Installing Linux server from CDs
 - Installation Types
 - Installation Class
 - Preparing Partitions
 - Selecting Packages
 - Creating Boot Disk
 - Installing from Network
 - Installation Server
 - Selecting Installation source
 - Configuring x-windows
 - Configuring apache web server
 - Configuring DHCP server
 - Configuring firewalls
 - Installing and configuring packages
 - Preparing Remote boot thin client for Linux(pxes)
(for Linux RedHat Fedora 3 is to be used)

Books Recommended:

1. *Introduction to Networking* Recharad McMohan Tata McGraw Hill Publication
2. *Computer Network Fundamentals and application* – R S Rajesh Vikas Publication
3. *Unleashed Windows 2003 Server* – Todd Brown & Chris Miller Techmedia SAMS Publication
4. *Microsoft Windows 2000 Professional* – Paul Cassel Techmedia SAMS Publication
5. *Fedora 3 Bible* – Christopher Negus Wiley Dreamtech Publication

Websites : www.microsoft.com/server/2003/
www.redhat.com/fedora3/

Project [408 & 409]

A project report has to be submitted as per the rules described in (IV).
Some additional guidelines regarding the Project Report are:

Number of Copies:

The student should submit two hard-bound copies of the Project Report.

Acceptance/Rejection of Project Report:

The student must submit a Synopsis of the project report to the Institute for approval. The Director holds the right to accept the project or suggest modifications for resubmission. Only on acceptance of draft project report, the student should make the final copies.

Format of the Project Report:

The student must adhere strictly to the following format for the submission of the Project Report.

a. Paper:

The Report shall be typed on white paper, A4 size or continuous computer stationary bond, for the final submission. The Report to be submitted to the University of Pune must be original and subsequent copies may be photocopied on any paper.

b. Typing:

The typing shall be of standard letter size, double spaced and on one side of the paper only, using black ribbons and black carbons.

c. Margins:

The typing must be done in the following margins :

Left ----- 35mm, Right ----- 20mm

Top ----- 35mm, Bottom ----- 20mm

d. Binding:

The Report shall be rexin bound in black. Plastic and spiral bound Project Reports not be accepted.

e. Front Cover:

The front cover should contain the following details :

TOP : The title in block capitals of 6mm to 15mm letters.

CENTRE: Full name in block capitals of 6mm to 10mm letters.

BOTTOM: Name of the University, Year of submission - all in block capitals of 6mm to 10mm letters on separate lines with proper spacing and centering.

f. Blank Sheets:

At the beginning and end of the report, two white black bound papers should be provided, one for the purpose of binding and other to be left blank.

Abstract:

Every report should have an Abstract following the Institute's Certificate. The abstract shall guide the reader by highlighting the important material contained in the individual chapters. The abstract should not exceed 800 words.

Contents:

The Contents shall follow the abstract indicating the title of the chapters, section, subsection etc.

The report should contain the following :

- Institute Certificate
- Certificate from Company
- Acknowledgments
- Abstract
- List of Figures
- Tables
- Nomenclature and Abbreviations

Contents of the Project Report:

1. Company Profile (only for M.I.S. projects)
2. Introduction to the project
3. Scope of Work
4. Existing System and Need for System
5. Operating Environment - Hardware and Software
6. Proposed System
 - 6.1 Objectives to be fulfilled
 - 6.2 User Requirements
 - 6.3 Requirements Determination Techniques and Systems Analysis Methods Employed
 - 6.4 Prototyping
 - 6.5 System Features
 - Design of Input
 - Design of Output screens and reports
 - Module specifications
 - D.F.D.'s and ER's
 - System flow charts
 - Data Dictionary
 - Structure charts
 - Database / File layouts
 - User Interfaces
 - Coding system
 - Design of Control Procedures
 - Design of Exception Handling

6. Testing Procedures and Implementation Phases
7. Acceptance Procedure
8. Post-Implementation Review
- 9 User Manual
 - Menu explanation
 - User guide
 - Expected problems/errors and their solutions
10. Problems encountered
11. Drawbacks and Limitations
12. Proposed Enhancements
13. Conclusions
14. Bibliography

Annexures

- Sample documents (manual or computer generated)
- Source code listing in a separate file
- Output reports

List of Tables:

The Contents shall be followed by a 'List of Tables' indicating the table number, table title and the corresponding page number(s). The table number shall be in decimal point notation indicating the chapter number and the table number in that chapter.

NOTE : Any reference within the text shall be given by quoting relevant number. eg : 'Table 5.2'

List of Figures:

The 'List of Figures' shall follow the 'List of Tables' indicating the figure numbers, figure titles and corresponding page number. The figure numbers shall be in decimal point notation.

Nomenclature and Abbreviations:

The 'Nomenclature and Abbreviations' shall follow the 'List of Figures' and contain the list of symbols and abbreviations and their long names used. The nomenclature should be given for ER's, DFD's, STRUCTURED CHARTS, RUN CHARTS and for all other symbols in the techniques used. The nomenclature for every techniques should appear on a separate sheet. As far as possible, accepted standard symbols shall be used.

Chapter Numbering:

The chapters shall be numbered in Arabic numerals. Section and subsections of any chapters shall be in decimal notation. All chapters shall begin on a new page. The titles for the chapters and the title shall be properly centered at the top of the page and have three spaces between them.

Company Profile:

This chapter should highlight the company details. This would be chapter 1 and should include the main stream activity of the company, the product line of the company and

the details of the department where the student was working. This should not exceed two pages or 800 words.

N.B.: Only relevant for M.I.S. Projects.

Introduction:

The 'Introduction' shall highlight the purpose of project work. It will also define the chapters to be followed in the Project Report.

Existing System and the Need for the System:

If there is some system already in use, then a brief details of it must be included, to help the examiner understand the enhancements carried out by the student in the existing system. Based on this, the student should exemplify the need for the system. If there is no existing Computerised system, the need for computerisation should be given.

N.B.: Only where relevant.

Proposed System:

1. **Objectives** : clearly define the objective(s) of the system in a few lines.
2. **User Requirements** : State the requirements of the user in an unambiguous manner.
3. **Requirements Determination Techniques and System Analysis Methods Employed** : Use the formal methods to describe the requirements of the user, like Fact finding Methods, Decision Analysis, Data Flow Analysis etc.
4. **Prototyping** : If the prototypes has been developed prior to the detailed design, then give details of the prototype.
5. **System Features**
 - 5.1 Design of Input : Inputs, Data Dictionary, Screens, Validation Methods etc.
 - 5.2 Design of Output : Outputs, Reports etc.
 - 5.3 Design of Control Procedures : Structured charts, Module Specifications, Run charts etc.
 - 5.4 Design of Exception Handling : Error handling and recovery procedures.

The choice of including topics in this chapter entirely depends on the student. The freedom given for this chapter is obvious. Students will be working on various types of projects. A typical M.I.S. development project must include DFD's and structured charts etc. Thus a student is allowed to employ the techniques of his/her own choice suitable to his/her work. However, there is a guideline that the student must employ the techniques taught during the MCM course.