NORTH MAHARASHTRA UNIVERSITY, JALGAON

REVISED SYLLABUS FOR M.C.M.(2 YEARS) (4 SEMESTER) COURSE
(WITH EFFECT FROM JUNE,1997)

Semester I

Paper 101. Elements of Information Technology
Paper 102. FOXPRO
Paper 103. 'C. Programming
Paper 104. Windows and M.S. Office
Paper 105. Financial Accounting and Costing
Paper 106. Practicals and Seminars

Semester II

Paper 201. Software Engineering
Paper 202. Foxpro II
Paper 203. C Programming II
Paper 204. Financial Accounting and Applications
Paper 205. Principles and Practice of Management
Paper 206. Practicles and Seminars

Semester III

Paper 301. Data base Management Systems
Paper 302. M.I.S.
Paper 303. Quantitative Techniques I
Paper 304. Data Structure
Paper 305. Elective I
Paper 306. Practicals and Seminars

Semester IV

Paper 401. Unix
Paper 402. Business Applications
Paper 403. Quantitative Techniques II
Paper 404. Project work
Paper 405. Elective II
Paper 406. Practicals and Seminar

Paper 101. Elements of Information Technology

1. Computer :
Block diagram of elements of digital computer-their functions.
Memory, CPU, I-O devices. Secondary storages, magnetic Tape, Disk, CD-ROM.
Other recent development-Scanners, Digitizer, Plotters.
Hardware and Software.
Micro, Mini and Main-frame computers-their features (4)

2. Representation of Data :
Binary,OCtal, Hexadecimal, BCD, EBCDIC, ASCII,Conversions.
Simple Additions, Subtractions, Multiplications, Divisions (in Octal and Hexadecimals). (2)

3. Boolean Algebra :
Algebra Rules and DeMorgan's rules.
Simplification of equatons.
Logic Circuits-- AND, OR, NAND, NOR,Exclusive or and NOR truth tables, Gated flip-flops, Registers, Accumulators. (3)

4. Introduction to 8086/8088 microprocessors-architecture
Buses-Data, Address, Control.

5. Software :
Introductionto Programming, Flowcharts and Algorithms.
System software, application software, firmware.
Machine, Assembly, and Higher Level Languages Cobol, C++ Java, Stored program concept. (5)

6. Operating System-Introduction :
Process management-FCFS. Round Robbin, Priority Based.
Memory management-segmentation, paging, virtual memory.
I-O managementConcept of I/O port.
File management-FAT, file handling functions.
Software and Hardware interrupts, I/O and Memory based addresses, DMA channels. (5)

7. File :
Concept of file.
File organization and accessing techniques-Indexed, Line sequential, Hashed.
File handling functions : Sorting, Merging, Indexing, Updating. (3)

8. Instructions and Addressing Techniques :
Instruction execution cycle.
Direct,Indirect,Relative,Paging,Indexed. (2)

9. Board View of Operating Systems :
MS-DOS, UNIX, MS-WINDOWS 95. (5)

10 Basic concepts of Networking and Data Communications :
Introduction to LAN and basic communication concepts.
OSI 7 layers. Topologies, Protocols, ethemet, Arnet..
TCP/IP. (5)

11. Introduction to virus and Vaccines, applications, DBMS
E-Mail and Internet. (2)

PAPER 102 : FOXPRO

A. USING FOXPRO 2.5 UNDER DOS (USAGE LEVEL)

1. What is a database ?
2. Simple and Relational Databases
3. Limitatiosn of DBase III Plus
4. Advantages of using FOXPRO
5. Introduction to FOXPRO menu structure
6. Introduction to FOXPRO dialog boses.
7. Using FOXPRO Command Window
8. Creating a database structure.
   (a) Defining structures of a database file
   (b) Entering field names.
   (c) Saving database file.
   (d) Copying and modifying structures of database files.
9. Adding Editing and Viewing Data
   (a) Appending data
   (b) Changing or Editing data
   (c) Resizing or Changing the order of fields
   (d) Partitioning the Window
   (e) deleting a record
   (f) Moving the record pointer.
10. Understanding Indexes and Expressions
   (a) Types of Indexes (Single, Comound, Structural compound, Compact)
   (b) Overview of Index Dialog Box
   (c) Indexing commands
   (d) Understanding Expressions
   (e) Selecting and Controlling Index Files.
11. Generating Reports
   (a) Designing the report form.
   (b) Page Layout
   (c) Page Preview
   (d) Layout Toos
   (e) Title/summary
   (f) Data Grouping
   (g) Variables.

PAPER 103. :'C' PROGRAMMING

1. C Fundamentals :

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 Operators. Preprocessor directives (like £include, £define), Symbolic constants, Comments, sizeof, cast (2)

2. Loop Control Structure :

The for statement, Nested for Loop : for loop variants, the while statement, Increment/decrement operators, Use of break and continue, the do-while loop. (6)

3. Decision and Case Control Structure : (6)

If statement, if-else construct, use of logical operators and Compund Relational Tests, Nested if statements. The else if constaruct, the relational operators, the conditional expression (ternary) operator. The switch Statement with or without break.

4. Arrays:

Declaration, Referring individual elements, Entering data into an array, reading data from an array. Array initialisation, Bounds checking, Passing array elements to a function, Passing Array to a function. (6)

5. Storage Classes:

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

6. Functions :

Arguments and local variables, Returning Function Results, Default Return type and the type void, Passing values between functions. Declaration of function type, Recursion. Functions with variable arguments. (6)

7. Character Strings :

what are strings, standard library string functions, strlen ( ). strcat ( ), strcpy ( ), strcmp ( ). (2)

8. Pointers : Introduction to Pointers, Pointers and Structures, Pointers and Functions, Pointers, and Arrays, Operation on pointers, Pointers to Functions. Two Dimension Arrays and Pointer. (6)

9. structures : (4)

Declaring Structure, Initializing structures, structure variables, accessing structure elements, Arrays of Structures. Functions and Structures. Structures within structures, Structures containing arrays. Predefined structures such as FILE.

10. Input/Putput in C :

Console I/O functions, printf ( ), Scanf( ), Getch( ), getchar ( ), puchar ( ), gets ( ), puts ( ).

Disk I/O Functions. High level file I/O or standard functions fopen ( ), putc ( ), fclose( ), fgets ( ), fputs ( ), fread ( ), fwrite ( ), fseek ( ), feof ( ), fflush ( ). Use of above file handling functions for standard devices like stdin, stdout, stdprn and stderr. (6)

11. Dynamic Memory Allocation and Memory functions :

memcpy ( ), memset ( ), calloc ( ), malloc ( ), free ( ), realloc ( ). (4)

12. Other features and Miscellaneous functions :

Enumerated data types, typedef, atof ( ), atoi ( ), atol ( ), toupper ( ), tolower ( ), isalnum ( ), isalpha ( ), isdigit ( ), exit ( ). Use of command line arguments. (3)

13. C Preprocessor :

Micro expansion, Macros with arguments, File inclusion. (1)

14. Single-user Btrieve :

Concept of Btrieve record manager, Usage of btrieve. exe, butil. exe, turcbtrv. c, Butil description file, status code and messages, Btrieve function call BTRV and its usage, Btrieve record operations in Clanguage for open, close, insert, update, delete, get equal, get next, get previous get greater get greater or equal, get less than, get less than or equal, get first, get last. (6)

PAPER 104. WINDOWS AND M.S. OFFICE

1. Environent of a Windows Application

The Graphics Oriented User Interface, The pros & cons of the Visual Interface. MS Windows' window component, The Graphics device Interface, The display context, The GDI I/P Routines, A Multitasking Environment, H/W Independence. (5)

2. Basic Concepts of Window Program

Hardware and Software requirements, derived Data types, Handles, Hungarian notation, STRICT, windows.h; argsused pragma, WinMain () and it arguments-hInstance, hPrevInst, lpszCmdLine, nCmdShow, Comments,Instances, API functions, message boxes macros, icons, main window, window class, WNDCLASS structure, event-driven programming, window procedure, window messages, message loop, basic working of a Message System. Message format, The sources of a Message, Some Common Message types, The Sequence of Message Processing. The Role of Messages. (10)

3. Resource Handling

Using a text Resourace, Message Box, Message Box types, Menus-Receiving commands from the User, Creating Pop-up Menus, displaying & Processing a Menu, Accelarators, Dialog Boxes : Receiving data from the user, Defining a dialog box using the Dialog Box Editor, Programming for the Dialog Box, Device Context, Resources and Projects, Icons, Stock Cursors, Disk Files, File Common dialogs. (15)

105 FINANCIAL ACCOUNTING AND COSTING - I

1. Concept of Management Accounting (5)
2. Financial Accounting (25)

   Type of Accounts-Principles of Double Entry-daybooks and Ledger Aaccount and Trial Balance Sheet

   -Profit and Loss Account and Balance Sheet of a Proprietor and a Limited Company.

3. Financial Analysis. (25)

   Cash Flow and Funds Statements

   Ratio Analysis. (45)

4. Cost Accounting

   Elements of Cost-Material, Labour and Overheads

106. PRACTICALS/SEMINARS

The practicals should cover programming on the computer related to courses 102 and 103. At least 20 program assignments should be done by each student for each of these courses. In addition, the students should be taught how to use a wordprocesso, spreadsheet and basic commands of DOS and the operational aspects of MS-WINDOWS. 50 marks should be reserved for evaluating these assignments.

Every student should present 2 seminars during the year. At least one of these should be on a topic related to computer, whole the other may be on a topic related to any other subject in the m.c.m. curriculum. 30 marks should be reserved for seminars.

Business Communications should be taught to the students and 20 marks should be reserved for this. The syllabus for Business Communications is :

1. Nature, scope, function, limitations.
2. Communication process and principles of communication.
3. Inter-personal communication (face to face), telephonic meetings and group communications, board and union meetings, leadership qualities. Body language and KINESICS.
4. Public speaking (verbal and non-verbal communication).
5. Communication with media.
6. Listening skills.
7. Barriers in communication.
8. Written communications.

Preparation, analysis and interpretation of reports, Business letter writing.

SEMESTER II

201. SOFTWARE ENGINEERING

1. System concept, Intetgrated systems, sub-systems, modules.
2. Role of Systems analysts and others in system development.
3. General phases of System Development Life Cycle. Feasibility Study, Requirements Capture, Detailad. Systems Analysis, Systems Design, Testing, On-Site Implementation and Maintenance.
4. Fact finding Methods.
5. Different Approaches to Software Development.
   *Classic Method : Waterfall Model.
   *Prototyping.
   *Sprial Model.
   *4 GL or Data Oriented Aooroach.
6. Structured Analysis and Design method and Software Engineering techniques, Tools and Methodologies in Systems Development.
Application System Modelling.
   Data Modelling : Entity Relationship method
   Process Modelling :Data Flow Diagrams
   Concepts of Object Oriented Modelling
   Temporal Modelling : State transition Diagrams
Database Design Methods
   Mapping E-R model to arrive at the Database Design
   Normalisation Technique for Database Design
   Controlled De-Normalisation
System Documentation Techniques
   System Flow Charts
   Functional Decomposition Diagrams
   Structure Charts
   Structured Flow Charts (N-S Diagrams)

Logic Representation Techniques
   Decision Trees
   Decision Tables
   Pseudocode and Structured English
7. User Interface Design
   Menu. Screen and Report Layouts designing
   The Mode/style of interaction between the system and user.
8. Codes Designing for field values
   Designing Code-less system
9. Introduction to Computer Aided Software Engineering (CASE)
   Centralised Data Dictionaries
   Diagrammers, Database Designer, Code generator in CASE tools, tools for Static and Dynamic Analysis of programs and Impact analysis for introducting changes.
   The concept of Reverse Engineering.
10. Types of Data Processing
   Batch, On-line and Real Time processing.

202 FOXPRO - II

PROGRAMMING WITH FOXPRO 2.5

1. Brief Introduction to Structural Programming
2. Input/Output Variables.
   (a) Variables
   (b) Formatted I/O.
3. Control Statements
   (a) Looping
   (b) Selection.
4. Procedures and Parameters.
5. Screen Builder
6. Menu Builder
7. Compilation and Execution of Files
   (a) Creating Executive Files.

8. Windows
   -Defining
   -Activating
   -Deactivating
   -Hiding
   -Releasing
   -Showing
9. Popup
   -Defining
   -Activating
   -Deactivating
   -Hiding
   -Releasing
   -Showing
10. Menus
   -Defining
   -Activating
   -Deactivating
   -Hiding
   -Releasing
   -Showing
11. SQL statements
12. Usage of Rushmore Technology
13. Commands and functions
14. Arrays.
   (a) Arrays
   (b) Using Arrays as Memory tables
15. Macris
   (a) Macris Substitutions

C. OTHER ADDITIONAL FEATURES OF FOXPRO

1. RQBE
2. FOX Grah
3. FOX DOC

D. APPLICATION DEVELOPMENT

1. Sample Application including the following :
   (a) The Main Program
   (b) The Insert Program
   (c) The Edit Program
   (d) The Delete Progam
   (e) Reports

2. Applications should be any one of the following :
   Payroll, Inventory, Financial Accounting.

203. 'C' PROGRAMMING - II

1. Introduction : Difference between C c++. The Object-Oeiented Approach, Object-oriented methodologies in Analysis. Design an din Programming Characteristics of Object-Oriented Languages-Classes, Objects, Encapsulation, Inheritance. Polymorphism. C++ and C.

2. Structures : An Introduction, Other Structure Features, Structures within Structures, Enumerated Data Types.

3. Functions : Simple Functions, Passing Arguments to Functions, Returning Values from Functions, Reference Arguments, Overloaded Functions, Address of an overloaded function, passing an address of an overloaded function as an argument to another fucntion, Inline Functions, Default Arguments, variables and Storage Classes.

4. Objects and Classes : A Simple Class, Difference between class, structure and union in C++, C++ Objects, Constructors and Destructors Concept of an ADT, Constant member function, Objects as Function Arguments, Returning Objects from Functions, Classes, Objects and Memory, Static Class Data.

5. Operator Overloading Introduction, Overloading, Unary and Binary Operators, Concatenating Strings, Comparison operators. Arithmetic Assignments Operators, Data Conversion-Between Basic Types, Between Objects and Basic Types. When to Use What.

6. Inheritance : Derived Class and Base Class. Derived Class Constructors, Class Hierarchies, Public and Private Inheritance, Multiple Inheritance, Containership-Classes within Classes. Inheritanc eand Program Development.

7. Pointers : The Delete and New Operator, Pointers to Object, An Array of Pointers to Objects, Pointers to Pointers, Debugging Pointers, Difference between pointers and references.

8. Virtual Functions and Other Subtleties : Virtual Function, Pure Virtual Functions, Friend Functions, Static Functions, Assignments and Copy Initialization. The Copy Constructor, The this Pointer, Abstact classes.

9. Introduction to templates andexception handling, Function with Templates.

10. Files and Streams : Streams, String I/O, Character I/O, File Pointers, Error Handing, Redirection, Command-Line Arguments, Pointer Output, Overloading the <<and >> Operators.

11. Linkage of C and C++.

Internal assignments :

The Internal assignments should be such that the design aspects of Objext Oriented Programming be highlighted.

204. FINANCIAL ACCOUNTING AND APPLICATION.

1. Methods of Costing - Job, Contract and Process Costing
2. Marginal Costing- Break Even Analysis, Cost-volume,Profit Ration and its application
3. Budgets and Budgetary control
4. Computer Applications of financial accounting systems, need, problems and advantages, Process of conversion of manual accounting system into computerised accounting system.

205. PRINCIPLES AND PRACTICE OF MANAGEMENT

1. Basic concepts of Management - Management - Nature, Scope and Management.
2. Principles of Management
3. Management - Administrations and organisation
4. Process of Management - Planning' Organisation , Staffing, Directive bond cordinary
5. Concepts, Importance and Techniques.

SEMESTER III

301. Data Base Management Systems (DBMS)

1. Introduction

History : Advantages and limitations of DBMS, Users of DBMS, Software Modules in DBMS, Architecture of DBMS. (2)

2. Modelling Techniques

Different Types of Models, Introduction to ERD. (3)

3. Hierarchical Database

Introduction. (1)

4. Network Database

Introduction (1)

5. Relational Database

Introduction, Codd's 12 Rules, Concept of Domain, Tuple, Cardinality, Comparison Between HDB_NDB_RDB. (4)

6. Normalisation

Advantages and disadvantages of Normalisaton, INF-2NF-3NF-4NF-5NF-BCNF-DKNF rules with examples, Anomalies (4)

7. Integrity Constraints

Entity-Domain-Referential integrity rules, Assertion and Triggers concept. (4)

8. Recovery Mechanisms

Re covery 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. (4)

9. Concurrancy Controls

Problems of concurrent Transactions, Control Mechanisms such as Locks, Time-Stamps, Optimistic-Scheduling and MVT. (4)

10. Distributed Databases

Concepts, Data Distributions Techniques. (2)

11. Security and Privacy. (1)

12. ANSI SQL commands. (5)

Note :

1. ERD technique is not to be covered in detaisl as the same is expected to be covered in Course 104.

302. M.I.S.

-organisational structure and functions.
-Systems approach to organisation
-Dynamics to Decision - Making
-Control / Control by exception / Feedback control
-Law of requisite variety
-Systems approach to MIS design
-Factoring / Boundaries / Coupling
-Decision support systems
-DSS concepts
-Simple models
-Dialogue Manager
-Executive Information Systems
-Information requirement
-Mothod of access
-Presentation
-Workflow Management
-Concepts
-Task definition
-Client & Server
-Design

303. QANTITATIVE TECHNIQUES - I

1. Role of Quantitative techniques in decison making.
2. Linear Programming
   Problem formulation
   Simplex method
3. Transportation problem

304. DATA STRUCTURE

1. Concept of datatype, data object, data structure and representation, abstract data structures, introduction to analysis of data structure and algorithms.

2. Arrays as ADT, implementation of arrays, Single dimensional and multidimensional.

3. Stacks as ADT, implementation of stack, push and pop operations, conversion of infix to postfix notation. Evaluation of postfix notation, concept of back-tracking, recursion using stacks (concept only)

4. Queues as ADT, implementation of queues, Application of queues to premptive scheduling in transaction processing, Circular queues using arrays.
5. Linked list as ADT, signly linked list, operations on linked list, implementations of stacks and queues using linked lists, Doubly linked lists, application of double linked lists in dynamic storage management, concept of generalied link list.

6. Trees as ADT, baisc terminology, Binary tree representation using arraays and linked lists, binary tree traversal-inorder, postorder, preorder (both recursive and non-recursive versions) Threaded binary trees, traversal of thread-ed binary trees, Binary tree representation of trees.

7. Symbol Table : Concept of table, static tree table, binary search, tree definition and search algorithms, Huffman algorithm, Dynamic tree table as binary search tree. Concept of height-balance (AVL) trees, introduction to reblancing techniques (concept only), insertion and deletion of node in dynamic binary search tree, Hash table, Hashing techniques.

8. Searching : Linear searach, binary search, depth first search and breadth first search on binary trees.

9. Sorting : Bubble sort, insertion sort, quick sort, heap sort.

305. ELECTIVE - I

Oracle or Ingres or Informix should be taught. The Syllabus for this course should be flexible, to be left to the teaching faculty.

306 PRACTICALS AND SEMINARS :

SEMESTER - IV

401. UNIX

1. File systems and Concepts of Files, directories and inodes.
2. File oriented commands like cat, cp, ln, mv, rm, etc.
3. File permissions.
4. Directory oriented commands like ls, mkdir, cd, rmdir, pwd.
5. Inter-user communication commands like write, mail, mesg, at, wall.
6. Common commands like kill, data, wc, sleep, who, ps.
7. Pipes and redirection, Background tasks (& nohup).
8. UNIX utilities : grep,pr,cpio,tr,cut,paste,diff,cmp, comm, uniq,sort, ar, lp, init, shutdown, halt, sys, mkfs, fsck, script, tar,cron, find, file, nice.
9. Shell programming : (Bourne Shell only) Shell meta characters, shell variables, environment rariables, profile, positional parameters, command line arguments, for/while/until loop, if and case structure, test, trap, interactive shell script, arithmetic on shell' variables, error checking.

10. AWK programming : Operators, variables, constants, tokens, patterns and meta, characters, arithmetic and string functions, special variables, if-else, while, for, array, report generation.

11. DOS related commands : doscp, dosrm.

402. BUSINESS APPLICATIONS

1. Financial Accounting :
   Introduction to computerised accounting system Coding Methods
   Dy Books, Ledger, Trial Balance, Balance Sheet, Profit and Loss Account.
   Input Controls-Audit Trail.
   Management and statutory reporting.
2. Fixed Deposit System :
   Types of deposit schemes-Category or Depositors Statutory Provisions.
   Interest Warrants and Deposit Register.
   Maturity and Renewal Procedures.
   Statutory and Management Reports.
   Payroll Procesing :
   Payslip Printing.
   Statutory Reports such as P.F., E.S.I, and Labour Welfare Fund.
   Payment of Bonus.
   Costing and Management Reports.
4. Sales Order Processing :
   Order acceptance and Recording
   Sales Invoicing.
   Sales Analysis based on Products, Customers and Terms.

5. Inventory Management :
Purchase order processing.
Stores accounting.
-Storestransactions-Receipts, Issues and Adjustments.
-Bin Cards and Stock Ledger.
-Inventory Levels-EOQ-ABC analysis,
Inventory Control Reports such as Slow Moving/Non-Moving Items.

6. Meterial Planning :
-Bill of Material
-Computing Gross/Net requirements.

7. Banking :
Functions and Reports related to Savings Bank Accounting.

8. Hotel Management :
Department Organisation of Hotel such as Room Occupancy, Room Service, Restaurants, House-keeping, Conferencing, Exhibitions, Parties, etc.
Kitchen Stores Accounting .
reservation, Check-in and Check-out.
Service Accounting and Bill Printing.
Management Reports.

9. Hospital Management :
Departmental Organisation of Sospital such, as In-Patient, Out-patiant, Laboratories, Pharmacy, Surgical Rooms etc.
Medical Stores Accounting.
Registration, Shifting and Discharge of patients.
Service Accounting and Bill Printing.
Management Reports.

403. QUANTITATIVE TECHNIQUES - II

1. Assignment problem
2. PERT and CPM
3. Simulation
Monte carlo Simulation.

404. PROJECT WORK

405. ELECTIVE II

Power Builder or visual basic should be thought. The Syllabus for this course should be flexible, to be left to the teaching faculty.

406. PRACTICALS AND SEMINAR