

"अंतरी पेटवू ज्ञानज्योत"
उत्तर महाराष्ट्र विद्यापीठ, जळगाव

उमवि/12/Inst.Syll./ 2024 /97

दिनांक :- 15.11.1997

प्रति,

उत्तर महाराष्ट्र विद्यापीठाच्या सर्व मान्यताप्राप्त संस्थांचे मा.संचालक,
यांसी-

विषय :- एम.सी.एम.कोर्सचा दुरुस्त केलेला अभ्यासक्रम पाठविणेबाबत.
संदर्भ :- विद्यापीठाचे परिपत्रक क्र.48/1997,
जा.क्र.2937, दिनांक 27.5.1997.

महोदय,

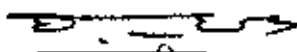
उत्तर महाराष्ट्र विद्यापीठाच्या मान्यताप्राप्त संस्थांचे मा.संचालक यांना विदितच आहे की, मा.विद्यापीठ अधिकार मंडळाने घेतलेल्या निर्णयानुसार सन 1997-98 या शैक्षणिक वर्षापासून एम.सी.एम. कोर्ससाठी नविन सुधारित अभ्यासक्रम लागू झालेला असून, सदरचा अभ्यासक्रम विद्यापीठाचे उपरोक्त संदर्भिय परिपत्रकासोबत आपणास यापूर्वीच पाठविण्यात आलेला आहे. तथापी सदर अभ्यासक्रमात आता काही ठिकाणी आवश्यक र्वी दुरुस्त्या व बदल करण्यात आले असून, सदर दुरुस्ती केलेल्या अभ्यासक्रमाची प्रत यापत्रासोबत आपणाकडेस पाठविली आहे.

करिता, सर्व मान्यताप्राप्त संस्थांचे मा.संचालक यांना विनंतीपूर्वक कळविण्यात येते की, विद्यापीठाचे उपरोक्त संदर्भिय परिपत्रकान्वये पाठविलेला एम.सी.एम. कोर्सचा पूर्वीचा अभ्यासक्रम रद्ददखतात समजण्यात यावा. व यापत्रासोबत पाठविलेला दुरुस्ती व बदल केलेल्या अभ्यासक्रमानुसारच पुढील कार्यवाही करावी. तसेच यापत्राचा आशय व सदरचा अभ्यासक्रम आपल्या संस्थेतील संबंधित प्राध्यापक तसेच एम.सी.एम.ला प्रवेशित झालेल्या विद्यार्थ्यांच्या नजरेस आणावा.

कळवे.

सोबत :- अभ्यासक्रमाची प्रत.

आपला विश्वासू,


उपकुलसचिव.

प्रत माहितीसाठी रवाना :-

- 1) मा.अधिष्ठाता, वाणिज्य व व्यवस्थापनशास्त्र विद्याशाखा, उमवि, जळगाव.
- 2) मा.चेअरमन व सर्व सदस्य, व्यवस्थापनशास्त्र अभ्यासमंडळ, उमवि, जळगाव.
- 3) मा.परीक्षा नियंत्रक, उमवि, जळगाव.
- 4) मा.उपकुलसचिव, परीक्षा-पूर्वार्ध-उत्तरार्ध, शैक्षणिक विभाग, उमवि, जळगाव.
- 5) मा.सहा.कुलसचिव, परीक्षा-पूर्वार्ध-उत्तरार्ध, सभा व दफ्तर विभाग, उमवि, जळगाव.
- 6) मा.प्रोग्रामर, संगणक विभाग, उमवि, जळगाव.

McMylabrus File

- d) The project work should be of such a nature that it could prove useful or be relevant from the commercial management angle.
- e) 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 the marks of the internal credit for theory and practicals to be communicated for all other courses.
- f) The project report should be prepared in a format prescribed by the University which also specifies the contents and the method of presentation.
- g) The project work will carry 40 marks for internal assessment and 60 marks for external viva. The external viva shall be conducted by two external examiners.
- h) Project work can be carried out in the Institute or outside with prior permission of the Institute.
- i) 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.

V) ASSESSMENT

- 1. The final total assessment of the candidate is made in terms of an internal assessment and an external assessment for each course.
 - a) For each paper, 40 marks will be for internal assessment and 60 marks for year end examination (external assessment), unless otherwise stated.
 - b) The division of the 40 marks allotted to internal assessment of theory papers shall be on the basis of tutorial work and written test.
 - c) The practical examination for papers No. 106, 206, 306 and 406 shall be conducted by two external examiner appointed by the University which shall carry 60 marks and the internal assessment of practical examination shall be conducted by the institute which shall carry 40 marks.
 - d) The internal marks will be communicated to the university at the end of each semester but before the semester examination. These marks will be considered for the declaration of the results.

e) In theory papers there shall be in all 8 questions out of which any five questions shall be attempted by the candidate. For MIS Papers minimum weightage of 20 marks to be given for case studies and 40 marks theory question to be given.

VI) EXAMINATION

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

VII) NUMBER OF PAPERS

a) Every candidate must secure 40% marks in each head of passing and in aggregate 50% mark.

b) The passing marks for external examination will thus be 24 out of 60 and for internal examination 16 out of 40.

VIII) MEDIUM OF INSTRUCTION

The medium of Instruction will be English.

IX) CLARIFICATION OF SYLLABUS

It may be necessary to clarify certain points regarding the course. The B.O.S shall study and clarify any difficulties from the Institutes.

X) REVIEW OF SYLLABUS

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

XI) DURATION OF THE EXAMINATION

Each session will be of 1 hours duration.

XII) ADDITIONAL COURSE

Students who have obtained their M.C.M. degree, can do an additional elective course. This could be done at any of the recognised Institutes offering the M.C.M. programme. The fees for this elective would be Rs. 5000 per additional elective course. The University will issue only a statement of marks for this elective course undertaken. Original marks/class obtained by the student will not be changed.

XIII) WORK UNDER OLD SYLLABUS

The last attempt for student enrolled for M.C.M. Part I 1996 will have to clear their subjects under the old syllabus by 2000 University examination and for students enrolled for M.C.M. Part II in 1997, will

NORTH MAHARASHTRA UNIVERSITY, JALGAON

MASTER IN COMPUTER MANAGEMENT

Introduction

1. The name of the programme shall be Master's Degree Course in Computer Management (M.C.M)
2. The knowledge and skills required to plan design and build complete Application Software Systems are highly valued in all industry sectors including business, health, education and the arts. The basic objective of the Master's Programme in Computer Management (MCM) is to provide to the country a study 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 programmers, systems analysts, programmer/analysts. Others seek entrepreneurial roles in the computer world as independent suppliers of systems and equipments. 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 reservations, banking systems), accounting function, sales analysis, games, Forecasting and simulations database management, design support and data communications.
4. Specific elective course to be offered in functional areas have to depend on student preferences, faculty availability and needs of the user systems in the region in which the educational institution is located.
5. a) The first year of the programme is a mix of computer related and general business courses. The computer-related course use microcomputers to introduce standard techniques of programming, the use of software packages including word processors, spreadsheets and databases ; systems analysis and design. The general business courses include the functional areas of management like accounting, sales, purchase, inventory and production. The course would emphasise the study and creation of business applications, rather than mere programming.

b) In the second year, students are exposed to system development in the information processing environment, with special emphasis on management information systems and software Engineering for small and medium computer systems. Also, exposure to microcomputer technology micro-based systems design and micro applications software including networks and graphical user interface system is provided.

6. Duration : The M.C.M. programme will be a full time two year's master's Degree course in computer management.
7. The new curricula would focus on imparting skills, rather than knowledge to students. In other words, less theory, more practicals.
8. The Institutes should organise placement for the MCM students, by interacting with industries and software consultancy houses in and around the region in which the educational institution is located.
9. Intake : IN each class, not more than 60 students will be admitted.

II) ELIGIBILITY FOR ADMISSION

Graduates possessing 45% or more marks of 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

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

- a) Project work should be done individually
- b) Students should take guidance from an internal guide and prepare a project report on "project work" in 2 copies to be submitted to the Director of the Institute by 31st December.
- c) The project should contain an introduction to the project, which should clearly explain the project scope in detail. Also, Data Dictionary, DFDS, ERDs, File designs and a list of output reports should be included.

have to clear their subject as per old course by April 2001 University examination. Therefore, the equivalence to the old syllabus would be as detailed below:

Equivalence

Existing Paper and Title	Proposed Paper and Title
1. Computer Fundamentals and Data Processing	1. Elements of Information Technology
2. System analysis & Design	2. Software Engineering.
3. Programming Language.	3. FOXPRO - I
4. Accounting & Financial Mgt.	4. Financial a/c & costing
5. Quantitative Techniques	5. B.T.
6. M.I.S.	6. M.I.S.
7. Data structure & algo.	7. Data structure & algo.
8. Data Base Mgt system	8. Data Base Mgt system
9. Unix	9. Unix
10. Application	10. Business Application
11. C Programming	11. C Programming - I
12. Project Report	12. Project Report
13. Internals - Part -I	13. Practical -sem I
14. Internals - part -II	14. Practical - sem II

Paper 102. C++
Paper 103. C. Programming
Paper 104. Windows and M.S. Office
Paper 105. Financial Accounting and Costing
Paper 106. Practicals

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. Practicals

SEMESTER III & IV (With effect from July, 1998)

Semester III

Paper 301. Database Management Systems ✓
Paper 302. M.T.S. ✓
Paper 303. Quantitative Techniques I ✓
Paper 304. Data Structure ✓
Paper 305. Elective I ✓
Paper 306. Practicals

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

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SYLLBUS FOR M.C.M.COURSE
SEMESTER - I.
(With effect from July,97)

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

2. Representation of Data :

Binary, Octal, Hexadecimal, BCD, EBCDIC, ASCII, Conversions.
Simple Additions, Subtractions, Multiplications, Divisions (in Octal and Hexadecimal).

3. Boolean Algebra : (ONLY Basic knowledge & introduction to basic concepts)

Algebra Rules and DeMorgan's rules.
Simplification of equations.
Logic Circuits- AND, OR, NAND, NOR, Exclusive or and NOR truth tables, Gated Flip Flops, Registers, Accumulators.

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

5. Software :

Introduction to Programming, Flowcharts and Algorithms.
System software, application software, firmware.
Machine, Assembly, and Higher Level Languages Cobol, C, C++
Java, Stored program concept.

6. Operating System Introduction : (ONLY types & function of operating system)

Process management-FCFS, Round Robbin, Priority Based.
Memory management-segmentation, paging, virtual memory.
I/O management Concept of I/O port.
File management-FAT, file handling functions.
Software and Hardware interrupts, I/O and Memory based addresses, DMA channels.

7. File :

Concept of file., File organisation and accessing techniques Indexed, Line sequential, Hashed.
File handling functions : Sorting, Merging, Indexing, Updating.

8. Instruction and Addressing Techniques :

Instruction execution cycle.
Direct, Indirect, Relative, Paging, Indexed.

9. Broad View of operating systems :

MS-DOS, Unix, MS Windows 95.

10. Basic concepts of Networking and Data Communications :

Introduction to LAN and Basic communication concepts.
OSI 7 layers. Topologies, Protocols, ethernet, Arnet.
TCP/IP.

11. Introduction to virus and Vaccines, applications, DTP

E-Mail and Internet.

BOOKS :

1. Computer Today, Hunt & Shelly
2. Computer & Cosmos, Sander
3. V.Rajaraman

PAPER 102 : FOXPRO

A. USING FOXPRO 2.5 UNDER DOS (USAGE LEVEL)

1. What is a database ?
2. Simple and Relational Databases
3. Limitations of DBase III Plus
4. Advantages of using FOXPRO
5. Introduction to FOXPRO menu structure
6. Introduction to FOXPRO databases.
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, Compound, Structural, compound, Compound)
 - (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 Tools
- (e) Title/summary
- (f) Data Grouping
- (g) Variables.

Books: R.K. Taxali
Gran 2.5

LIST OF PRACTICALS FOR FOXPRO (MEM I 102)

N.B. : First seven (7) practicals are sem. I and remaining for sem. II
Use of command window is expected.

- (1) Create the structure of a database file (minimum 5 fields must be included). add the records in it and display the selected fields (minimum 3 fields) for the records satisfying given conditions. Copy the file to another specified file, copy the selected records to another file.
- (2) Add the records in a database file whose structure is given. Sort the all the records in a specified order, sort the records satisfying given conditions.
- (3) Create the index files for a given database file, add the records from original and indexed database file.
- (4) Edit and delete the records satisfying the given conditions for a given database file.
- (5) Create the report with suitable titles for a given database file. The report should display only the field values of database file without any condition and grouping.
- (6) Create the report for a given database file with suitable titles to display the records satisfying given conditions (without grouping).
- (7) Create the report for a given database file with data grouping.

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. 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.

3. Decision and Case Control Structure :

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.

4. Arrays:

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

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.

7. Input/Output in C :

Console I/O functions, printf (), scanf (), getch (), getchar (), putchar (), gets (), puts (). Disk I/O Functions. High level file I/O or standard functions fopen (), fclose (), fgetc (), fputc (), fread (), fwrite (), fseek (), feof (), fflush (). Use of above file handling functions for standard devices like stdin, stdout, stderr and stderr.

8. Dynamic Memory Allocation and Memory functions : (ONLY INTRODUCTION)

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

9. Other Features and Miscellaneous functions :

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

10. C Preprocessor :

Macro expansion, Macros with arguments, File inclusion.

11. Single user Btrieve : (ONLY INTRODUCTION)

Concept of Btrieve record manager, Usage of btrieve, exe, out), exe, turbobrv, c, Butil description file, status code and messages, Btrieve function call BTRV and its usage,

Retrieve record operations in C language 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.

Books:

1. Spirit of 'C,
- (2) Let us 'C' Principal, Yashwant Kanetkar
- (3) Programming in 'C' Godfred .
- (4) Balagurusamy 'C' Programming

PRACTICAL ASSIGNMENTS C LANGUAGE

1. Write a program to calculate the sum of the digits of an integer number.
Ex. :- 1234 = 1+2+3+4 = 10
2. Write a program to find the compound interest and print the table which would give the value of compound interest for p = 1000, 2000, 3000, 4000, 5000, 10,000
Compound interest = $p \times (1 + R/100)^N - p$
Where p = Principal amount
R = rate of interest
N = Number of years
3. Write a program to find the number and sum of numbers greater than 100 and less than 200 that are divisible by 7.
4. A manufacturing company has classified its executives into four levels for the benefits of certain perks. The levels and corresponding perks shown below.

Level	Perks	
	Conveyance Allowance	Entertainment Allowance
1.	1000	500
2.	750	200
3.	500	100
4.	250	Nil

An executives gross salary includes basic pay, house rent allowance at 25% of basic pay and other perks. Income tax is with hold from the salary on a percentage basis as follows.

Tax Rate	Tax Rate
No tax Deduction	Gross \leq 2200
3 %	2200 < Gross \leq 4000
5 %	4000 < Gross \leq 5000
8 %	Gross > 5000

Write a program that will read an executive's job number, level number, and basic pay and then compute the net salary after withholding income tax.

$$\begin{aligned} \text{Gross salary} &= \text{Basic pay} + \text{HRA} + \text{Perks} \\ \text{Net salary} &= \text{Gross salary} - \text{Income tax} \end{aligned}$$

5. Determine the day of date (using function)

Here $N = 1461 * f(\text{year, month}) / 4 + 153 * g!(\text{month}) / 5 + \text{day}$.

where $f(\text{year, month}) = \text{year} - 1$ if month ≤ 2
 $= \text{Year}$ otherwise.

Using this formula calculate the value of N and subtract the constant 621049 from the value of N. (say $N = N - 621049$) and take the modulo $(N \% 7)$. The number we get number 0 to 6 that represents the day of the week. (Sunday through Saturday respectively).

6. Tower of Hanoi :

Tower of Hanoi is a well known children game played with three poles and a number of different sized disks. Each disk has a hole in the centre allowing it to be stuck around any of the poles. Initially, the disk are stuck on the left most pole in order of decreasing size i.e the largest disk on the bottom and the smallest disk on the top.

The object of the game is to transfer the disk from the left most pole to the right most pole, without never placing a larger disk on the top of a smaller disk. Only one disk may be moved at a time and each disk must be always placed around one of the poles.

Write a C language programme for the above problem

7. Write us write a simple C language program that will be in a sequence of ASCII characters and write out a sequence of encoded characters in its place. If a character in a letter or a digit we will replace with its next character in the character set except z will be replaced by a, z. by A, and 9 by 0, thus l becomes 2, c becomes d, and so on. Any other letters other than a letter and digit will be replaced by a symbol #.

8. Write a program, using function word length () which compute the word length of the host machine that is, the number of bit in an int and memint.
9. Sort the number using any sorting methods.
10. Conversion of decimal number to any base number (2 to 16) main ()

Function of the program. The program will arbitrarily be restricted to 10 clients. the last name of each client will be 20 character total field length. There will be five procedures in the operation of the program. They are:

1. Enter a client.
2. Find and display a client.
3. Update a client.
4. Delete a client.
5. Exit the program.

11. Using a top-down approach, you will first write the main() function of the program. The program will arbitrarily be restricted to 100 address of the clients. The structure of the record is as follows :

1. Name
2. Address
3. Pin code of the city.

There will be five procedures on the operation of the program. They are :

1. Enter a Record.
2. Display a Record
3. Save the data file
4. Load the data file
5. Exit the program

CHAPTER 104. WINDOWS AND H.S. OFFICE

1. Environment 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/O Routines, A Multitasking Environment, H/W Independence.

2. Basic Concepts of Window Program

Hardware and Software requirements, derived Data types, Handling, Hungarian notation, STRICT, windows, h; argsused, pragma, WinMain () and its arguments-hinstance, hPrevinst, lpstrCmdLine, 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.

3. Resource Handling

Using a text Resource, Message Box, Message Box types,
Menus-Receiving commands from the User, Creating Pop-up
Menus, displaying & Processing a Menu, Accelerators, 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, Stack
Cursors, Disk Files, File Common dialogs.

4. M.S. Office

Introduction to MS-Office, Installing MS-Office, The office
Manages, sharing information with MS-Office, The clipboard,
Alternation to the clipboard, Using the clipboard to cut,
copy & paste, The clipboard viewer object linking &
embedding (OLE), editing, linking information, editing
embedded objects, word processing with MS-WORD for windows,
Word basics, undo, redo, repeat, inserting text, Replacing
text, formatting text, copying from one word document to
another, Printing auto format.

Working with headers, footers & footnotes, tabs, tables &
sorting, converting table to text & vice-versa, Working
with graphics such as importing graphics, Saving & copying
graphics with the picture command, Using Words drawing
features, Drawing objects, colour filling templates, Wizards
& sample document, Writers tools, Typing symbols & special
bulleted list commands, spell check, auto text grammar
checker, word count & other statistic, table & contents,
creating an index, macros, Introduction to mail-merge.

Excel Basics, The usual spread sheet features, overview of
Excel features, Creating a new cell, selecting cells,
Rearranging worksheet, moving cell, deleting parts of
worksheet, merging part of worksheet, Excel page setup,
changing columns, Using border buttons & commands, changing
colour, & shading, Inserting & removing page breaks, Hiding
rows & column, Working with multiple worksheet, Viewing
multiple windows, summing information from multiple
windows.

Books : Pat Zeld - Window 3.11
Lafper - Window Prof. Notes
Window Programmings Principale Jim Concar

List of Programs for Windows

1. Introduction to windows

2. Accessories : File manager, Calculator, Time, Date, Sound recorder etc.
3. Creating document using WR
4. Creating, editing, Saving, Formatting document using ms word
5. Mail merge using ms word
6. Creating a worksheet.
(Entering data, calculating formulas, saving & closing the worksheet)
7. Editing & formatting the worksheet
 - a) Inserting & deleting columns & rows
 - b) Copy & Paste commands
 - c) Printing a worksheet
8. Creating charts [graphs]
9. Working with Database in Excell
 - Sorting data
 - Auto filler
 - Query.
10. Creating picture in paintbrush & copy it into word, write & excell.

105 FINANCIAL ACCOUNTING AND COSTING - I

1. Concept of Management Accounting
 2. Financial Accounting
 - Type of Accounts-Principles of Double Entry- daybooks and Ledger account and Trial Balance Sheet
 - Profit and Loss Account and Balance Sheet of a Proprietor and a Limited Company.
 3. Financial Analysis.
 - Cash Flow and Funds Statements
 - Ratio Analysis.
 4. Cost Accounting
 - Elements of Cost-Material, Labour and Overheads
 - Materials
 - 1) Methods of valuing Material issues i.e. LIFO, FIFO Simple & Weighted Average
 - 2) Economics Ordering quantity
 - 3) Various stock levels
 - Labours
 - Methods of wage payment
 - 1) Taylors system and Merrick system
 - 2) Halsey plan (3) Rowan plan (4) Gantt task bonus plan
 - Overhead
 - 1) Primary and Secondary distribution machine hour rate, and methods of absorption of overheads.
- Books :
1. Saxena & Vasit - Costing
 2. Accounting-duguples
 3. B.K. Bhar - Costing
 4. Management Accounting - ManMohan , S.N. Goyal, Agra Prakashan

106. PRACTICALS

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

The practical examination shall be conducted by two external examiner appointed by the University which shall carry 60 marks and the internal assessment of practical examination shall be conducted by the institute which shall carry 40 marks. (20 marks for curriculum & 20 marks for Business communication)

Business Communications should be taught to the students internally with introductory aspects. The syllabus for Business Communications is :

1. Nature, scope, reaction, 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 skill .
7. Barriers to communication.
8. Written communications.

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

List of Practicals :	Foxpro	5
	C language &	
	Windows	5
	Total :	10

Books : Umile Roy Business communication

M.C.M. SEMESTER II
(With effect from July, 1977)

201. SOFTWARE ENGINEERING

1. System concept, Integrated 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, Detailed 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.
 - *Spiral Model.
 - *4 GL or Data Oriented Approach.
6. Structural 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 introducing changes.
 - The concept of Reverse Engineering.
10. Types of Data Processing
 - Batch, On-line and Real Time processing.

Books : Roger Pressman - Software Engineering
James Sun - System Analysis

202 FOXPRO II

PROGRAMMING WITH FOXPRO 4.5

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. Popups
 - Defining
 - Activating
 - Deactivating
 - Hiding
 - Releasing
 - Showing
10. Menus
 - Defining
 - Activating
 - Deactivating
 - Hiding
 - Releasing
 - Showing
11. SQL statements
12. Usage of Bushmore technology
13. Commands and variables
14. Arrays.
 - (a) Arrays
 - (b) Using Arrays as Memory banks
15. Macros
 - (a) Macro Substitutions.
16. OTHER ADDITIONAL FEATURES OF FOXPRO
 1. RDBE
 2. FOX Gen
 3. FOX DDL

D. APPLICATION DEVELOPMENT

1. Sample Application including the following :
 - (a) The Main Program
 - (b) The Insert Program
 - (c) The Edit Program
 - (d) The Delete Program
 - (e) Reports
2. Applications should be any one of the following :
Payroll, Inventory, Financial Accounting.

LIST OF PRACTICALS FOR FOXPRO (202)

- (1) Write a program to group a given set of observations into given classes. (At least 5 classes and at least 25 observations must be given)
- (2) Write a program to prepare and display a table with suitable titles, giving interest and amount on a given fixed principal, fixed time and varying rates of interest.
- (3) Write a program using procedure/function to convert a given amount in figure into the amount in words.
- (4) Write a program to add the records in a database file whose structure is given, using custom screen. The program should give the facility to add as many records as needed. At least 5 fields must be given.
- (5) Write a program to display the records of a given database file either on screen or printer depending upon the request of the user (use of report creating facility is not expected)
- (6) Write a program to edit and delete the records from a given database file, using custom screen.
- (7) Write a program to create a simple menu to (1) display all the records from a selected file, (2) copy all the records from one specified file to another specified file, (3) delete all the records of a specified file.
- (8) Write a program to create a pull-down menu (1) to display the records satisfying given conditions, (2) to copy the records satisfying given conditions.
- (9) Write a program to add the new records in one database file and at the same time update the corresponding records in another related database file.
- (10) Write a program to print the formatted report either on the screen or printer (depending upon the request of the user) by making use of more than two database files.
- (11) Use of Foxgraph utility to draw business diagrams.

203. C++ PROGRAMMING - II

1. Introduction : Difference between C and C++. The Object-Oriented Approach, Object oriented methodologies in Analysis. Design an C++ Program illustrating 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 function, 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 ABI, 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-Classess within Classes, Inheritance and 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, Abstract classes.
9. Introduction to templates and exception handling, Function with Templates.
10. Files and Streams : streams, String I/O, Character I/O, File Pointers, Error Handling, 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 Object Oriented Programming be highlighted.

Practicals for C Programming

1. Write and run a program that reads three integers and prints the minimum and maximum. Use the conditional expression operator.
2. Write and run a program that reads four integers and prints them in the opposite order.
3. Write a C++ program that will ask for a temperature in Fahrenheit and display it in Celsius.
4. An electricity board charges the following rates to domestic users to discourage large consumption of energy :

For the first 100 units	10 P per unit
For next 200 units	50 P per unit
Beyond 300 units	60 P per unit

All users are charged a minimum of Rs. 500. If the total cost is more than Rs. 250.00 then an additional surcharge of 15% is added.

Write a program to read the names of users and number of units consumed and print out the charges with names.
5. Write programs to evaluate the following functions to 0.0001% accuracy.

$$a) \sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

$$b) \ln(1+x) = \frac{x}{2} - \frac{x^2}{4} + \frac{x^3}{6} - \frac{x^4}{8} + \dots$$

$$c) \cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$$

6. Write a program that reads one line of text and then prints the number of vowels that were read.
7. Write and test the following function that deletes all occurrences in s1 of characters in s2:


```
void del(char* s1, const char* s2)
```

for example, if s1 is the string "ABRACADABRA", and s2 is the string "AB", and then after the call del(s1, s2) the string s1 would be reduced to "RCDR".

- B. Write and test the function

```
int frequency(float a[], int n, int x)
```

This function counts the number of times the item x appears among the first n elements of the array a and returns that count as the frequency of x in a.

9. Let us consider a shopping list of items for which we place an order with a dealer every month. The list includes details such as the code number and price of each item. We would like to perform operations such as adding an item to the list, deleting an item from the list and printing the total value of the order.
10. A file contains a list of telephone numbers in the following form :

John	23456
Ahmed	9876

The names contain only one word and the names and telephone numbers are separated by white spaces. Write a program to read the file and output the list in two columns. The names should be left justified and the numbers right-justified.

11. Updating is a routine task in the maintenance of any data file. The updating would include one or more of the following tasks:
- . Displaying the contents of a file.
 - . Modifying an existing item.
 - . Adding a new item.
 - . Deleting an existing item.

12. Write a program which reads a text from the keyboard and displays the following information on the screen in two columns.
- (1) Number of lines.
 - (2) Number of words.
 - (3) Number of characters.
- Strings should be left justified and numbers should be right-justified in a suitable field width.

204. FINANCIAL ACCOUNTING AND APPLICATION.

1. Methods of Costing Job, Contract and Process Costing
 2. Marginal Costing- Break Even Analysis, Cost-volume, Profit Ratio 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.
- Books : Costing - B.K.Bhar
 Management Accounting - Man Mohan Boyal

205. PRINCIPLES AND PRACTICE OF MANAGEMENT

1. Basic concepts of management, Nature & scope of Management.
2. Principles of Management General Mgt. Administration & Organisation.

3. Process-

Planning steps promay function effective planning & Decision Making.

Organising - Types of Organisation Structure.

Delegation of authority Authority & responsibility.

Staffing - Selection Training & Development.

Directing - Leadership

Controlling - Communication & Motivation
Control technique.

Co-ordinative need & imp.

4. Techniques - M.B.D. & Organisation Development.

Ref. Books

Management - Harold Koontz
William Stanton.
Burton

Principles of Management - L. M. Prasad
Shrinivas & Chonawala.
Sherlekar & Sherlekar
Tripathi & Reddy

206 PRACTICALS :

The Practicals should cover Programming on the computer related courses. At least 10 program assignments should be done by each student.

The practical examination shall be conducted by two external examiner appointed by the University which shall carry 60 marks and the internal assessment of practical examination shall be conducted by the institute which shall carry 40 marks. (20 marks for curriculum & 20 marks for business communication)

Forpro - 10
C++ language 10

Total 20

SEMESTER III (With effect from July, 1998)

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. Modelling techniques

Different Types of Models, Introduction to ERD.

3. Hierarchical Database

Introduction.

4. Network Database

Introduction

5. Relational Database

Introduction, Code & 12 Rules, Concept of Domain, Tuple, Cardinality, Comparison between RDB, RDB, RDB.

6. Normalisation

Advantages and disadvantages of Normalisation, 1NF-2NF-3NF-4NF-5NF-6CNF-7CNF-8CNF rules with examples, Anomalies

7. Integrity Constraints

Entity domain and referential integrity rules, Assertion and Triggers concept.

8. Recovery Mechanisms

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.

9. Concurrency Controls

Problems of concurrent transactions, Control Mechanisms such as Locks, Two-Phase, optimistic Scheduling and MVT.

10. Distributed Databases

Concepts, data distribution Techniques.

11. Security and Privacy

12. ANSI SQL Commands.

Note :

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

- Books :
1. Henry Korth - Data Base Concepts
 2. C.J.Date - Systems Concepts
 3. Debei - Data Base Systems.

PRACTICAL
DATABASE MANAGEMENT SYSTEM PAPER 301

1. Designing & Creating a database & adding data by using

CREATE TABLE command

2. Modifying Database & Data entry screen forms using

ALTER TABLE table name
Add (newcolname datatype(size))

Modifying existing column

ALTER TABLE tablename
MODIFY (columnname newdatatype(size))

3. Using SQL.

- i) Nested queries using IN, EQUAL, TO etc.
- ii) Aggregate function

AVG, MIN, MAX, COUNT, SORT

- iii) Group by clause
- iv) Having Clause

4. Using DML.

- i) INSERT clause
- ii) UPDATE clause
- iii) DELETE clause
- vi) DROP clause

5. Trigger concept

302. M.I.S.

- organizational 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
- Method of access
- Presentation
- Workflow Management
- Concepts
- Task definition
- Client & Server
- Design

SOS. QUANTITATIVE TECHNIQUES 1

1. Role of Quantitative techniques in decision making.
2. Linear Programming
Problem formulation
Simplex method
3. Transportation problem
(algorithmic approach), Initial Basic, Feasible solutions,
North-west corner Rule, Matrix, Minima Method & Vogel's
Approximation, H.V. Method to find Optimum solutions

Books : G.I. L.C. Dnana
D.R. Jha
D.R. Gupta & Hire

S04. 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, preemptive scheduling in transaction processing, Circular queues using arrays.
5. Linked list as ADT, singly 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 generalised link list.
6. Trees as ADT, basic terminology, Binary tree representation using arrays and linked lists, Binary tree traversal-inorder, postorder, preorder (both recursive and non-recursive versions), Threaded binary trees, traversal of threaded 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 high-balance (AVL) trees, introduction to rebalancing techniques (concept only), insertion and deletion of node in dynamic binary search tree, Hash table, Hashing techniques.
8. Searching : Linear search, binary search, depth first search and breadth first search on binary trees.

*Informix

All basic topic mentioned in syllabus.

INFORMIX - SQL & databases:

Creating database, Using PERFORM - PERFORM Screens, Basic database queries, ALG reports, Multitable forms, Advanced RDSRL - Report queries & statistical : User menus, Advanced INFORMIX SQL - Advanced forms, inter joins, unions & self joins, Ad. Reports, DBAs: tables, indexes, partitions, Transactions, audit trails, & backups.

Practicals

Minimum 9 Practicalis best on above topics should be conducted.

Notes: Using INFORMIX SQL
Jonathan Lifford, Harlow.

306 SYLLABUS: There should be minimum 20 practicals

The practical examination shall be conducted by two external examiners appointed by the University which shall carry 60 marks and the internal assessment of practical examination shall be conducted by the institute which shall carry 40 marks. (20 marks for curriculum & 20 marks for business communication)

DATABASE MANAGEMENT SYSTEM	4 Practicalis
data structure	7 Practicalis
Electives	7 Practicalis
Total :	20 Practicalis

SEMESTER - IV (With effect from July, 1998)

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, pwd, cd, rmdir, pwd.
5. Inter user communication commands like write, mail, msg, at, wall.
6. Common commands like kill, date, 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 variables, 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.

Practicals

1) Write a shell script to create an output file which contain roll no from file 1 and corresponding names and marks from file 2 and file 3.
The output format is as follows:

Roll No.	Name of the Students	Marks1	Marks2	Marks3
----------	----------------------	--------	--------	--------

The file1 contains only rollno of student.

The file2 contains rollno and name of student.

The file3 contains rollno and marks occurs in three subject.

Enter the program and execute the same

Note: Create input files and enter 10 records.

2) Write a shell script to create a file which contains file name and time for each file in the current directory.

Where the time should be either morning, afternoon or evening.

For Examples : file.dat morning

file.dat afternoon

Enter the program and execute the same

Note: Create input file with 15 lines.

3) Write a awk program to create a text file "ODD" containing only ODD lines and text file "EVEN" containing only EVEN

lines from the input file. Enter the program and execute the same.

Note : Create input file with 15 lines.

3) Write a AWK program to print greatest common divisor of given two number.

GIVEN : First number ...
 second number ...

4) Write a AWK program to count an output file contains employee number, designation and increased salary of an employee from an input file "EMP.AWK".

INCREASEMENT OF SALARY % as follows:
Designation Increase in Salary
Manager 10%
Clerk 15%
peon 20%

The input file "EMP.AWK" having following record layout
empid, emp ID, designation, salary
Enter the program and execute the same.
Note: Sample input file with 10 records.

5) Write a shell script to count the number of words of each file in the current directory and to create a summary file with the following details.

File 1 file containing words < 100
second file containing words > 100 and < 200
third file containing words > 200
Enter the program and execute the same.

6) Write a shell script to send "Happy Birthday" message to another user, if the user login then execute the same program in background after every 15 seconds.
Enter the program and execute the same.
Note: Create necessary files.

7) Write a shell script to generate the N terms of following series:

1, 4, 9, 16, 25, 36,
Enter the program and execute the same.

8) Write a AWK program to print the continentwise population with country Name, population, continent Name.
Enter the program and execute the same.
Note: Create necessary files and assume suitable restrictions.

9) Write a shell script to create output file with following format:

Item no.	Description	Balance	Quantity
101	Material contains	Accn no.	Description, qty
102	Trans	contains	Item no, Trans code, qty
11	Item code = 1	Material is Sold	
12	Item code = 2	Material is Purchased	

- 11) Write a FORK program which will create FIRST file containing 1 to 5, 11 to 15, records & LAST file containing records 6 to 10, 16 to 20, 26 to 30 from the input file. Create input file INF & enter 15 records

102. BUSINESS APPLICATIONS

1. Financial Accounting :
 - Introduction to computerised accounting system Coding Methods
 - By Banks, Ledger, Trial Balance, Balance Sheet, Profit and Loss Account.
 - Input Controls and Trail.
 - Management and Statutory Reporting.
2. Fixed Deposit System :
 - Types of deposit schemes, Category of Depositors Statutory Provisions.
 - Interest Warrants and Deposit Register.
 - Maturity and Renewal Procedures.
 - Statutory and Management Reports.
 - Payroll Processing :
 - Pay Slip Printing.

 - Statutory Reports such as P.F., E.S.I, and Labour Welfare Fund.
 - Payment of Bonus.
 - Costing and Management Reports.
4. Sales Under Processing :
 - Order acceptance and Recording
 - Sales Invoicing.
 - Sales Analysis based on Products, Customers and Terms.
5. Inventory Management :
 - Purchase order processing.
 - Stores accounting.
 - Stores transactions Receipts, Issues and Adjustments.
 - Bin Cards and Stock Ledger.
 - Inventory Levels, FIFO/ABC analysis.
 - Inventory Control Reports such as Slow Moving/Non-Moving Items.
6. Material 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,
Reception, Porters, etc.
Financials Accounting,
Reservation, Check in and Check out.
Server Accounting and Bill Printing.
Management Reports.

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

10. COMPANY PROJECTS - 10

11. Design of program
12. Design of program
13. Design of program
14. Module of the program.

15. Interview with the student. Assessment shall be carry
for the project. The student shall carry 60 marks
16. Evaluation

17. Answer under E:0
18. Introduction to Java, Introduction to SQL and using SQL :
insertion, update, delete, select, aggregate operations, Update
operations, data manipulation operations, control and objects,
program, write program, power of the functions, graph.

19. Interview.
20. Interview. Interview based on the above topics should be conducted

Part A. Visual basic

1. Introduction to Visual Basic. Project window, Properties Windows,
New design windows, etc.
2. Writing a program by showing the interface. Setting a few properties
of the program.
3. Control, events and properties using specific types of controls
Label, Text box, Command button, Frames, Check boxes, etc.
4. Control, events, properties and text files. Finding with text and numbers
5. Making the user interface. If.....Then..... Else, Select case
For.....do, Do.....Loops.....
6. Interview with the student.

- 7) Using Menu Design windows, Adding items to a Menu, Assigning shortcuts Keys, Creating a Dialog Box
- 8) Error handling using on Error statement, on Error GOTO, etc.
- 9) Using Arrays and Creating files.

Practicals

1. Design an application to explain the use of all control classes.
2. Develop an application to
 - a. Manipulate objects on different forms.
 - b. event Model of Visual BASIC
3. Develop a graphical editor
4. Manipulation of tabcontrol & querydef objects.
5. Designing new classes using MFC
6. Drawing in the client area of a window.
7. Creating popup menu.
8. Develop application allows you to
 - a. Hook sounds to various windows system events, text buttons & window actions
 - b. Animate your icons.
 - c. Create & edit your own icons, cursors & small images
 - d. provide a popup program launcher.

106. PRACTICALS

Based on Electives & Unix, there should be minimum 20 practicals based on Electives (10 Practical) and Unix (10 Practical)

The practical examination shall be conducted by two external examiners appointed by the University which shall carry 60 marks and the internal assessment of practical examination shall be conducted by the Institute which shall carry 40 marks. (20 marks for curriculum & 20 marks for business communication)

End