॥ अंतरी पेटवू ज्ञानज्योत ॥

NORTH MAHARASHTRA UNIVERSITY,
Jalgaon – 425 001

Syllabus for T.Y. B.Sc. (Computer)

Instruction
Two tutorials and two seminars
shall be conducted per paper,
xcluding the regular teaching schedule.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
SYLLABUS for (T.Y. B. Sc. (Computer Science)

STRUCTURE
(With Effect From Academic Year 2004-2005)

Paper - I	System Programming - I	System Programming – II
Paper -- II	Visual Basic	LINUX Operating System
Paper -- III	Software Engineering	MIS
Paper – IV	Computer Aided Graphics	Theoretical Computer Science
Paper – V	Microprocessor	Computer Networks
Paper – VI	Elective – A Oracle 8I	Developer – 2000.
	Elective – B Java programming – I	Java programming - II
Paper – VII	Lab on System programming - I	Lab on System programming-II
Paper –VIII	Lab on Visual Basic	Lab on LINUX
Paper- IX	Lab on Oracle / Java- I	Lab on Developer 2000 / Java- II

Paper –I
Section- I
System Programming – I

1. **Introduction**   L: 06 M: 06
   - Introduction to system software
   - Components of system software
   - Evolution of system software
   - Introduction to software processors (translator, loader, interpreter)

2. **Assembler**   L: 14 M: 12
   - Elements of an assembly language programming
   - Simple assembly scheme
   - Pass structure of assembler
   - Design of two pass assembler
   - Forward reference and cross reference

3. **Macros and Macro processors**   L: 06 M: 06
   - Definition and call
   - Macro expansion
   - Nested macro calls
   - Advanced macro facilities
   - Design of a macro preprocessor

4. **Compilers**   L:14 M: 14
   - Fundamentals of language processing
   - Fundamentals of language specifications
   - Scanning and parsing

5. **Loaders and linkers**   L: 06 M: 06
   - Relocation and linking concepts
   - Program relocatibility (Non-relocatable programs, relocatable programs, self relocating programs)
   - Concept of overlays

6. **Software tools**   L: 06 M: 06
   - Software tools for program developments
   - Editors
   - Debug monitors

Reference :
1. D.M. Dhamdhere, Introduction to system software.
2. D.M. Dhamdhere, Systems programming and operating system.
l. John Donovan, System programming.

Paper –I
Section- II
System Programming – II

1. **Operating system services**   L: 04 M: 04
   1.1. Types of services
   1.2. The user view
   1.3. The operating system view

2. **CPU scheduling**   L: 12 M: 12
   2.1 Multiprogramming concept
   2.2 Scheduling concept
   2.3 Scheduling algorithms

3. **Memory management**   L: 12 M: 12
   3.1 Bare Machine
   3.2 Resident monitor
   3.3 Swapping
   3.4 Multiple partitions
   3.5 Paging
   3.6 Segmentation

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4. Disk and drum scheduling   L: 06 M: 06

    4.1. First-come-first-serve scheduling

    4.2. Shortest seek time first

    4.3. SCAN, CSCAN

5. Deadlocks   L: 10 M: 08

    5.1. The deadlock problem

    5.2. Deadlocks characterization

    5.3. Deadlock prevention

    5.4. Deadlock avoidance

    5.5. Deadlock detection

    5.6   Recovery from deadlock

6. Introduction to Distributed operating system   L: 08 M: 08

    6.1. Definition

    6.2. Goals

    6.3. Design issues in distributed operating systems

    6.4. The client-server model

Reference books:

1 Peterson Silberschatz, Operating system concepts, Addison Wesley

2. Andrew S Tanenbaum, Modern operating system, P.H.I New Delhi

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Paper - II
Part I
VISUAL BASIC

1. GETTING STARTED   L: 04 M: 04

Why Windows & why Visual Basic

Working with Visual Basic

Initial Visual Basic screen and its components

SDI Environment

Toolbars

Toolbox

Using all the menus in VB interface

2. **BUILDING THE USER INTERFACE**   L: 06 M: 04
Creating Controls
The Name Property
Properties of Command Buttons
Simple event procedure for Command Buttons
Access keys
Image Controls
Textboxes, Labels, Message boxes, The Grid & Navigating between controls

3. **STEPS IN PROGRAMMING**   L: 06, M: 04
Data types, Variables & Operators
Controlling program flow
Built – in Functions in VB

4. **WRITING YOUR OWN FUNCTIONS & PROCEDURES**   L: 04, M : 04
Function procedures
Sub procedures
Advanced uses of Procedures & Functions

5. **ORGANIZING INFORMATION VIA CONTROL**   L: 08, M:10
Control Arrays
List & Combo boxes
Flex Grid Control
Timers
Common Dialog Boxes
Menus
MDI Forms
Microsoft Windows Common Control

6. **TOOLS & TECHNIQUES FOR TESTING & DEBUGGING**   L: 04 M: 04
Testing
Bugs
The immediate Window & Debugging tools
Stopping program temporarily

7. **GRAPHICS**   L: 06 M: 07
Fundamentals of graphics
The Lines & Shape Control
Graphics via code
Lines & Boxes
Circles, Ellipse & Pie chart

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8. **BASIC FILE HANDLING**
   File commands   L: 06 M: 05
   Sequential Files
   Random Access File

9. **ACCESSING DATABASES**
   Accessing database   L: 06 M: 05
   Data Control, DAO, ADO
   Visual Basic & Access Connectivity

10. **DESIGNING REPORTS**
    Introduction to report designer   L: 02 M: 03
    Creating Report
    Data Report
    Data Environment

References: -

1. Gary Cornell, Visual Basic 6 - The Complete Reference VB (BPB Publications).

PAPER II : Part II
Linux Operating System

1. **Introduction to Linux :**
   Linux History, Linux as Operating System, Linux Applications, Linux Distribution.   L: 03 M: 02

2. **Overview of X-Windows and GNOME :**
   What is X-Windows ?, Comparision of Microsoft Windows and X-Windows, X Servers, Windows Manager, Desktop Environments.   L: 04 M: 02

3. **Using GNOME and X-Windows :**
   GNOME Panel, GNOME Interface, Xterm, Utilities of X-Windows.   L: 02 M: 02

4. **Introduction to Linux commands :**
   What is Linux command?, How it works ?, command options and other parameters. Common Linux commands , su, pwd, cd, ls, more less, find, grep, tar, gzip, man, xman, cat, cal, echo, clear, kill., Wildcards * and ?   L: 06 M: 04

5. **Working with Files :**
   File operations like copy, delete, move, rename, create, Creating Symbolic Links.   L: 03 M: 02

6. **Using Shell :**   L: 08 M: 08
     Comparison of Shells sh, csh, bash, ksh.Overview of bash Shell, Setting Environment Variables, Input and Output Redirection, Filename Completion, Command Alias, Command-Line Editing, Command History List, Pattern Expansion.

7. **System Administration :**   L: 04 M: 04
     Managing Users, Managing Groups, System Start-Up.

8. **gawk programming :**   L: 12 M: 12
     What is the gawk Language ? Files, Records and Fields, Pattern- Action Pairs, Calling gawk programs, Control Structures   if Statement, while Loop, for Loop, next and exit, Arrays.

9. **Programming in C :**   L: 08 M: 08
     The GNU C Compiler, debugging GCC Programs with gdb, C Programming Tools – xxgdb, calls, cproto, indent, gprof, f2c and p2c.

10. **Linux Networking :**   L: 04 M: 06
     TCP/IP fundamentals, TCP and UDP services and ports.

Reference :
1. Tim Parker, Linux Unleashed.
2. Arman Danesh, Mastring Linux.

Paper – III
Part – 1
Software Engineering

1. **Introduction :**   L: 06 M: 06
     Software concept, Integrated systems, Subsystem modules, Role of system analysis and other system development.

2. General Phases of system development life cycle, Feasibility study, Requirement capturing, Detailed system analysis, System design, Testing, On site implementation and maintenance, Fact finding methods.   L: 06 M: 06

3. **Different approaches to software development :**   L: 04 M: 04
     Classic methods, Waterfall model, Prototyping. (4)

4. Structured analysis & design method & software engineering Techniques, Tools and   methodologies in system development. Application system modeling. Data Modeling : Entity Relationship Method, Process modeling : Data Flow Diagram, Concept of Object Oriented Modeling, Mapping E-R model to arrive at the database design. System decomposition diagram. Structure charts.

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Structured Flowcharts (N-S Diagram). Logical representation the techniques. Decision tree, Decision table. Pseudo code and structured English.

L: 10 M: 10

User Interface Design, Menu Screen and report layout designing. The mode/style of interaction between the system and user.   L: 06 M: 04

5   Code design for field value, Characteristics of good codes, Types of code.

L: 04 M: 04

6   Introduction to computer aided software engineering (CASE), Centralised data dictionary. Diagramer, Database designers, Code generator in CASE tools, Tools for static & Dynamic analysis of programs and impact analysis for introducing changes. The concept of reverse Engineering. Introduction to ERWIN.   L: 10 M: 10

7   Software Quality Management, Quality control, Quality Assurance, Quality standards.   L: 06 M: 06

Reference Books:-
1   Pressman, Software Engineering.

Paper – III
Part - I
MIS

1. **Introduction to Management Information System :**   L: 08 M: 08
    Definition, Need of MIS, Advantages.

2. **Structure of MIS :**   L: 14 M: 14
    Organisational structures, Operating element of an Information system, MIS for decision making, MIS structure based organizational functions, Information system for any function, Organisational MIS, MIS as a pyramid, Users view for MIS, MIS for planning , control & decision making.

3. **Information Concepts :**   L: 06 M: 04
    Definition of Information, Characterostocs of information, Parameters for Quality information, Types of information.

4. **Decision Concept and MIS development :**   L: 12 M: 12
    Decision types, importance, law of requisite variety, Steps in MIS development, Waterfall and prototype model, Database & IT requirements for MIS.

5. **Case Study.**   L: 12 M: 12

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References :-
1.   Davis & Olson, Management Information System, Tata Mc Graw Hill.
2.   Jawdekar, Management Information System – Second Edition, Tata McGraw Hill.
3.   Oak, Management Information System, Pragati Publication.

PAPER IV: PART I

COMPUTER AIDED GRAPHICS

1.   Introduction   L: 03 M: 02
   1.1.   The origin of Computer Graphics
   1.2.   How the interactive graphics display works
   1.3.   Display Types: Random Scan and Raster Scan
   1.4.   Examples of graphical software
   1.5.   Application of Computer Graphics

2.   Line Drawing Techniques   L: 04 M: 04
   2.1.   Co-ordinate Systems
   2.2.   The Simple DDA
   2.3.   The Symmetrical DDA
   2.4.   Bresenham's Algorithm

3.   Two Dimensional Transformations   L: 04 M: 06
   3.1.   Transformation Principles
   3.2.   Concatenations
   3.3.   Matrix Representation

4.   Clipping and Windowing   L: 05 M: 06
   4.1.   Cohen-Sutherland algorithm
   4.2.   Mid-point Subdivision
   4.3.   Polygon Clipping
   4.4.   Viewing transformation
   4.5.   The Windowing Transformation

5.   Graphical Input Techniques   L: 08 M: 06
   5.1.   Introduction
   5.2.   Pointing and Positioning Devices
   5.3.   Positioning Techniques
       5.3.1.   Positioning constraints
       5.3.2.   Scales and Guidelines
       5.3.3.   Rubber Band Techniques
       5.3.4.   Dragging

5.3.5. Positioning Text
5.4   Pointing and selection
      5.4.1   Selection
      5.4.2.   Selection feedback
      5.4.3.   Multiple selection
      5.4.4.   Menu Selection
5.5   Inking and Painting
      5.5.1   Painting
      5.5.2   Constrained Painting

6. **Raster Graphics and Solid Area Scan-conversion**   L: 10 M: 08
    6.1.   Introduction
    6.2.   Generating Raster Image: The Frame Buffer Display
    6.3.   Scan Converting Line Drawings
    6.4   Scan Converting Polygons
       6.4.1   Coherence
       6.4.2   (YX) Algorithm
       6.4.3.   Painter's Algorithm
       6.4.4.   Priority and The Y-X Algorithm
       6.4.5.   Properties of Scan Conversion Algorithms

7. **Realism in Three Dimensional Graphics**   L: 06 M: 06
    7.1.   Techniques for Achieving Realism
    7.2   Modeling 3-D Scenes
    7.3.   Modeling and Realism

8. **Three Dimensional Graphics**   L: 06 M: 06
    8.1   Transformations
    8.2.   Transformation in Viewing
    8.3.   The Perspective Transformation
    8.4   3-D Clipping

9. **Hidden Surface Elimination**   L: 04 M: 06
    9.1   Object Space and Image Space Algorithms
    9.2.   The Depth-Buffer Algorithm
    9.3.   Warnock's Algorithm

Text Book:

1. William M. Newman and Robert F. Sproull, Principles of Interactive Computer Graphics (Second Edition), Tata-McGraw Hill Publication

Reference :

1. Rogers, Procedural Interactive Computer Graphics, McGraw Hill Book Company Ltd.
2. Mathematical Elements of Interactive Computer Graphics, McGraw Hill Book Company Ltd.

PAPER IV: PART II
THEORETICAL COMPUTER SCIENCE

1. **Preliminary**   L: 04 M: 04
   1.1. Strings, alphabets and language
   1.2. Inductive Proofs
   1.3. Relations

2. **Finite Automata and Regular Expression**   L: 12 M: 12
   2.1. Finite State System
   2.2. Basic Definitions
   2.3. Non-deterministic Finite Automata
   2.4. Finite Automata with ϵ-Moves
   2.5. Regular Expression
   2.6. Application of Finite Automata

3. **Properties of Regular Sets**   L: 08 M: 08
   3.1. The Pumping Lemma for Regular sets
   3.2. Closure properties of regular sets

4. **Context Free Grammars And Languages**   L: 12 M: 12
   4.1. Motivation and Introduction
   4.2. Context Free Grammar
   4.3. Derivation Tree
   4.4. Simplification of context free grammar
       4.4.1   Useless Symbols,
       4.4.2 ϵ production
       4.4.3   Unit Production
   4.5. Chomsky Normal Form
   4.6. Greibach Normal Form
   4.7. Concept of Context free Language

5. **Push Down Automata**   L: 10 M: 08
   5.1. Informal Description
   5.2. Definitions
   5.3. Pushdown Automata and context free Language

6. Turing Machines and Chomsky Hierarchy   L: 08 M: 06
6.1.   Introduction
     6.2. The Turning Machine Model
     6.3. Regular Grammars
     6.4. Unrestricted Grammar
     6.5. NOTE: Theorems are not for Proof

Text Books:
1. John E. Hopcraft and Jeffery D. Ullman, Introduction to automata theory, language and computations.

Reference:
1. Danial A. Cohen, Introduction to Computer theory.
2. K.L.P. Mishra and N. Chandrasekaran, Theory of computer Science.

Paper – V
Part – I
Microprocessors

1. **Introduction to 8085 microprocessors :**   L: 06 M: 06
   Pin diagram, Architecture.

2. **Introduction to 8086 :**   L: 10 M: 14
   Architecture, Pin Diagram, addressing modes, operating modes, operation of 8086.

3. **Architecture of 80186, 80286, 80386, 80486 & Pentium :**   L: 04 M: 04

4. **I/O Programming :**   L: 08 M: 08
   Fundamental I/O consideration, programmed I/O, Interrupt I/O, Block Transfer & DMA I/O design.

5. **System Bus Structure :**   L: 06 M: 06
   Minimum mode, Maximum Mode, System bus.

6. **I/O Interface :**   L: 18 M: 12
   Serial communication interface, Asynchronous & Synchronous communication 8251 PCI, Parallel communication - 8255 A PPI, Keyboard & Display, DMA Controler, A Floppy disk Controler

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