North Maharashtra University, Jalgaon
New Syllabus with effect from Year 2006-07
TE Computer Term I

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Microprocessor II	4	-	2	3	100	25	25	-
2	Theory of Computer Science *	4	-	-	3	100	-	-	-
3	Computer Network *	4	-	2	3	100	25	-	25
4	Computer Graphics *	4	-	2	3	100	25	-	-
5	Systems Programming *	4	-	2	3	100	50	-	25
6	Advanced Development Tools Laboratory *	-	-	4	-	-	50	-	-
	Total	20	0	12		500	175	25	50
	Grand Total	**32**			**750**				

TE Computer Term II

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Microprocessor III	4	-	2	3	100	25	-	-
2	Operating Systems *	4	-	2	3	100	25	-	25
3	Software Engineering *	4	-	2	3	100	25	-	50
4	Database Management System *	4	-	2	3	100	25	25	-
5	Analysis and Design of Algorithms	4	-	2	3	100	25	-	-
6	Practical Training/Mini Project/Special Study		-		-	-	25	-	-
	Total	20	0	10		500	150	25	75
	Grand Total	**30**			**750**				

* Common subject with TE IT

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING)
(w.e.f. 2007-08)

TERM – I

MICROPROCESSOR II

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 25 Marks
Practical: 25 Marks

Unit – I
Dos: File System, boot record, FAT, Device Drivers, Installable device drivers. Structure of device drivers, .com and .exe files.
Basic I/O Interface: Introduction. I/O Port Address decoding, 8255: Programmable Peripheral Interface.8254: Programmable Interval Timer.

(10 Hrs, 20 Marks)

Unit – II
Basic I/O Interface: 8251: Programmable Communication Interface. The Parallel Printer Interface (LPT). Interfacing 7-segment display, Stepper motor interfacing, Interfacing ADC & DAC. Disk Reading Method- FM,MFM. Introduction to CD recording. TSR programs: Concepts and implementation.

(10 Hrs, 20 Marks)

Unit – III
Hardware Organization of PC: Motherboard Component Logic.I/O Channels. Memory Map. Interrupts. DMA Channels. Reset Logic, CPU nucleus logic,DMA logic, NMI logic, RAM,ROM logic. RTC ,PC cards. Keyboard Interface block diagram.
CRT Controller 8275, PC Display Adapters-CGA.EGA.VGA.SVGA. Principles of AGP

(10 Hrs, 20 Marks)

Unit – IV
Bus Interface: The ISA Bus, the Extended ISA(EISA) and VESA Local Buses. The Peripheral Component Interconnect (PCI) bus, the Universal Serial Bus(USB). Floppy Disk Controller 8272,FDC system Interface, Overall operation of Floppy disk Subsystem. Overview of Hard Disk Controller Organization.HDC Commands.

(10 Hrs, 20 Marks)

Unit – V
Microcontrollers: Different Types of microcontrollers. 8051 microcontroller Architecture. 8051 hardware Feature. Input/output pins. Ports and Circuits.External memory. Counters and Timers. Serial dada I/O.Interrupts . 8051 programming.Addressing Modes.

(10 Hrs, 20 Marks)

Reference Books -

1. B.Govindarajalu, "IBM PC and Clones" Tata McGrawHill
2. Mazidi," The 8051 Microcontroller & Embedded Systems , " Pearson LPE
3. Jeff Duntemann,"Assembly Language Progg. For IBM PC Family, 3rd edition,Dreamtech (Wiley India)
4. Antonakos, " An Introduction to the Intel Family of Microprocessors," – Pearson LPE

5. Douglas Hall, "Microprocessor and Interfacing", Tata McGrawHill, revised 2nd Ed.
6. Ray Duncan. "Advanced MS-DOS" BPB.
7. Peter Abel, Niyaz Nizamuddin, "IBM PC Assembly language and Programming", Pearson
8. Ray and Bhurchandi. "Advanced Microprocessors and Peripherals" Tata McGraw Hill, 2nd Ed.
9. Barry B Bray. "The Intel Microprocessors-Architecture.Programming and Interfacing". Pearson LPE/PHI, 7th Ed.
10. Kenneth J.Ayala. "8051 Microcontroller"Penram Internationals", Penram International, 2nd Ed
11. Manoharan, Kannan, "Microcontroller based System Design", Scitech
12. Badri Ram."Advanced Microprocessors and interfacing".Tata McGraw Hill.
13. Myke Predko."Programming and Customizing 8051 Micocontroller" Tata McGraw Hill
14. Korneev n kiselev,"ModernMicroprocessors",3rdedition,Dreamtech Press(WileyIndia)

List of experiments -

Group A:

1. Interfacing ADC with 8086.
2. Interfacing DAC with 8086.
3. Centronics parallel Printer interface.
4. PC to PC Communication using serial port in 8086.
5. Write a Device Driver Program.
6. Interfacing Stepper motor with 8086.
7. Reading partition table from Hard Disk.

Group B:

1. Read/Write/Format sector/Track of floppy.
2. Mouse Interfacing.
3. TSR Routine.
4. Program for Rolling Display using 8051.
5. Design of graphic editor.
6. Waveform generation using 8051.
7. Program for Generating Speaker tones by using PC.

The term work should include minimum of 10 Assignment.(5 from each group).Assignment no.5 from group A is compulsory.

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TERM – I

Theory of Computer Science

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I

Mathematical Preliminaries: Alphabets, Strings, Languages, States, Graphs and trees, Concept of basic machine.

Finite State Machines: State tables, Transition graph, Adjacency matrix, Moore and Mealy FSM's, Deterministic and Non-deterministic FSM's, Equivalence of DFA and NFA, FSM with Epsilon moves, Minimization of FSM

(10 Hrs, 20 Marks)

Unit – II

Regular Expressions: Definition, Building RE, Converting DFA's to RE, Conversion of RE to NFA. Properties of Regular Sets: Pumping lemma for regular sets, Applications of Pumping lemma, Closure properties of Regular sets, and Decision algorithms for regular sets.

(10 Hrs, 20 Marks)

Unit – III

Grammars: Definition, Production rules, Formalization, Derivation trees, Ambiguous grammar, Removal of ambiguity, Reduced form grammar – Removal of unit productions, Epsilon productions, Useless symbols, Chomsky hierarchy.
Context Free Grammars: Definition, Simplification of CFG, Regular Grammar – Definition, Left linear and right linear regular grammar, Inter-conversion between left linear and right linear grammar, Reduced Forms – CNF and GNF, Reduction to CNF and GNF, Construction of regular grammar from DFA, Construction of FA from regular grammar.
Context Free Languages: Definition, Properties, Pumping lemma for CFL's, Decision algorithms for CFL's, CYK algorithm

(10 Hrs, 20 Marks)

Unit – IV

Pushdown Stack Memory Machines: Definition, PDM examples, Power of PDM, Deterministic and Non-deterministic PDM, PDA and CFL, Construction of PDA from CFG, Construction of CFG from PDA.
Production Systems: Definition, Post canonical system, PMT systems, Acceptors and Generators, Markov algorithm

(10 Hrs, 20 Marks)

Unit – V

Turing Machine: Definition, Notations, Transition diagram, Power of TM over FSM, PDM and PM, Design of TM, Universal TM, Church's Turing Hypothesis, Multi-stack TMs, TM limitations, Halting problem, Undecidability, Tractable and intractable problems

(10 Hrs, 20 Marks)

Reference Books -

1. E V Krishnamurthy, 'Theory of Computer Science', EWP.
2. Hopcroft, Ullman, 'Introduction to Automata Theory' Narosa.
3. K.L.P.Mishra, 'Theory of Computer Science', PHI.
4. Daniel Cohen, 'Introduction to computer Theory', Wiley India
5. John Martin, 'Introduction to Language and Theory of Computations', TMH.

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TERM – I

Computer Network

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Oral: 25

Unit – I

Review of Data Communication and Introduction to computer networks.

Data Link layer: Data Link layer design issues, Elementary data link layer protocols, Sliding window protocols, Data Link Layer switching, Bridges 802.x to 802.y, Local inter-networking, Spanning tree and remote bridges.

Review of network connecting devices and multiple access protocols.

(10 Hrs, 20 Marks)

Unit – II

Network Layer: Logical Addressing - IPv4 addresses- Address space, notations, Classful addressing, Classless Addressing, Network Address Translation.IPv6 addresses- Structure and address space

Internet Protocols: Internetworking- Need of network layer, datagram network, connectionless network

IPv4- Datagram, Fragmentation, Checksum, Options

IPv6- Advantages, packet formats, extension headers

Transition from IPv4 to IPv6: Dual stack, Tunneling, Header Translation

(10 Hrs, 20 Marks)

Unit – III

Network Layer: Address Mapping - ARP, RARP, BOOTP and DHCP

ICMP: Types of messages, message formats, error reporting, query, debugging tools

IGMP: Group Management, messages, message format, IGMP operations, Encapsulation, Netstart utility.

ICMPv6: Error reporting and queries

Delivery: Direct versus Indirect delivery

Forwarding: Techniques, process, routing tables

(10 Hrs, 20 Marks)

Unit – IV

Unicast Routing Protocols: Optimization, Intra and Inter domain routing, distance vector routing, link state routing, path vector routing

Multicast Routing Protocols: Unicast, Multicast and Broadcast, applications, routing protocols

Transport Layer: Process to process delivery, UDP

(10 Hrs, 20 Marks)

Unit – V

TCP/IP Protocol Suite: Addressing

TCP: Services, features, segments, connections, flow control, error control, congestion control

Congestion control: Data Traffic, open- loop, closed- loop congestion control, congestion control in TCP and frame relay

Quality of Service: Flow characteristics and classes, techniques to improve QOS such as Scheduling, Traffic shaping, resource reservation, admission control

Integrated Services: Signaling, flow specification, admission, Service Classes, RSVP, problems with Integrated Services

(10 Hrs, 20 Marks)

Reference Books -

1. Andrew S. Tanenbaum, “Computer Networks”, 4th edition, Pearson LPE /PHI.
2. Behrouz Forouzan, “Data Communications and Networking”, TMH, 4th Ed.
3. Irvine,”Data Communication and Networks:An Engg. Approach” Wiley India
4. S. Keshav, “An Engineering Approach to Computer Networking”, Pearson Education, 5th Ed
5. Irvine Olifer,”Computer Networks:Principles,Technologies and Protocols” Wiley India

List of experiments -

1. Study of network resources and various components.
2. TCP/IP Socket Programming.
3. Implementation of Data link layer protocol.
4. Implementation of Network routing algorithm.

5. Implementation of data compression and decompression algorithm (Huffman Algorithm).
6. Implementation of Network security algorithm (Encryption and Decryption Algorithm).
7. Program using FTP to exchange files between computers,
8. Study of proxy server/DNS Server/mail server/NFS server.

1 to 6 assignments are compulsory.

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TERM – I

Computer Graphics

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Unit – I

Basic Concepts: Introduction to computer graphics, Types of Computer Graphics, Application of Computer Graphics, Graphics Standards, Graphics file formats such as BMP, TIFF, PCX and GIF

Interactive Computer Graphics: Working of Interactive Computer Graphics, Graphics Hardware, CRT, display and controller, Interlaced and non interlaced display, Vector and raster scan display, Random scan display, Frame buffers, Display adapters, VGA, SVGA, Bios video support, Various input devices, Graphics device drivers, Graphics software, Co-ordinates representations, Graphical functions, Plotters, Scanners, Digitizers and Light Pen.

Linear and Circle Generation: Line generation – DDA and Bresenhams /algorithm Thick line generation, Antialiasing, Circle Generation – DDA and Bresenham's Algorithm, Character Generation – Stroke principal, Starburst principle, Bitmap method.

(10 Hrs, 20 Marks)

Unit – II

Polygons: Types, representations, entering polygon, Polygon filling: Fance fill, Edge flag, Seed fill, Edge fill, Scan conversion algorithm. Scan conversion algorithm. Scan conversion: Real time scan conversion, Solid area scan conversion, Run length encoding, Cell encoding.
Segments: Concepts, Segment table, Segment creation, Deletion, Renaming, Image Transformation.

(10 Hrs, 20 Marks)

Unit – III

2D & 3D Geometry: 2D transformation primitives and concepts Translation, Rotation, Rotation about an arbitrary point, Scaling and Shearing, 3 D transformations, Rotation about an arbitrary axis, 3D viewing transformation , Concept of parallel perspective projections, Viewing parameters.
Clipping Fundamentals, Types of clipping.

(10 Hrs, 20 Marks)

Unit – IV

Windowing and Clipping: Viewing transformation, 2 D clipping and 3D clipping, Sutherland Cohen line clipping algorithm, Mid-point subdivision algorithm, Generalized clipping, Cyrus-Beck Algorithm, Interior and Exterior clipping, Polygon Clipping, Sutherland-Hodgman algorithm.
Hidden Surfaces and Lines: Back face removal algorithm, Hidden line methods, Z-buffer, Warnock and Painter algorithm, Floating horizon.

(10 Hrs, 20 Marks)

Unit – V

Light, Color and Shading: Diffused Illumination, Point source illumination, Shading algorithm, Color Models – RGB, HVS, CYM etc Elimination back faces, Transparency, polygons, B-Splines and corner, Bezier Curves, Fractals, Fractal Surfaces and lines

Graphical User Interface: Concepts of X-Windows, Concept of client/server model, Protocols, Message passing (only GUI related) Motif – widget, gadget structure (Only GUI concept) Concept of MS Windows, Open GL, Why 3D? Why Open GL? OpenGL and Animation

Graphics Standard: Introduction to graphics kernel system with basic primitives

Graphics Applications: Scientific and engineering applications, Business applications, Application concept in Animation and concept in Animation and Simulation

(10 Hrs, 20 Marks)

Reference Books -

1. David F. Rogers, "Procedural Elements for Computer Graphics:, Tata McGraw Hill, 2nd Ed
2. Steven Harringtom, "Computer graphics A Programming Approach", MGH
3. Hill, "Computer Graphics using OpenGL", Pearson LPE/PHI, 2nd Ed
4. Foley, Vandam, Feiner, Hughes, "Computer Graphics Pricipals & Practice", Pearson, 2nd Ed
5. Donald Hearn and Pauline Baker," Computer Graphics", Pearson LPE, 2nd Ed
6. Rao and Prasad," Graphics user interface with X windows and MOTIF", New Age
7. ISRD, "Computer Graphics", Tata McGraw Hill
8. Mukherjee, "Fundamentals of Computer Graphics and Multimedia", PHI

List of experiments -

1. Study of various Graphics Commands
2. Line generation using DDA
3. Different Line Style using Bresenhams Algorithm
4. Circle Generation using Bresenhams Algorithm
5. Program for Polygon Filling
6. Program for 2D Transformations (Translation, Rotation and Scaling)
7. Program for Segmentation
8. Program for line clipping
9. Program for Polygon clipping
10. Program for 3D rotation
11. Program for Parallel Projections
12. Program for Perspective Projection
13. Program for Animation
14. Program for Bezier Curve
15. Mini Project: Developing some Graphics application
16. Study assignment on any latest GUI application or mini-project.

The term work should include a minimum of ten assignments.

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TERM – I

Systems Programming

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Practical: 2 Hrs / Week

Term Work: 50
Oral: 25

Unit – I

Introduction: Introduction to system programming, Types of s/w and application software, System programming and system programs, Need of system software, Assemblers, Loaders, Compilers, Interpreters, Macros, Operating system and formula system, Translators and its types.

Assemblers: Structure of assembler, Basic function, Machine dependent and machine independent features of assembler, Types of assemblers – single pass, multi-pass, cross assembler, General design procedure of assembler, Design of Pass-I and Pass-II assembler (with reference to 8086 assembler), Single pass assembler for IBM PC, Implementation examples – MASM example.

(10 Hrs, 20 Marks)

Unit – II

Macros and Macro Processors: Definition and function of Macro Processor, Features of macro facility, Macro expansion, Nested macros, Design of macro processor – single pass and two pass macro processor, Detailed design of two pass macro processor.

Loaders and Linkage Editors: Basic loader functions, Relocation and linking concepts, Various loader schemes with their advantages and disadvantages, Other loader schemes – binders, Linking loaders, Overlays, Dynamic binders, Design of direct linking loaders, Specification of problem, Specification of data structures, Format of databases.

(10 Hrs, 20 Marks)

Unit – III

Design of a linker, A linker for MS DOS, Linking for overlays
Grammar and scanner, Overview of compilation process, Programming language grammar, Derivation, Reduction and syntax tree, Ambiguity, Regular grammar and regular expression, Basic functions of complier, Machine dependent and machine independent features of compiler, Types of compilers – single pass, multi-pass, cross compiler and pseudo code compiler, Phases of compiler

(10 Hrs, 20 Marks)

Unit – IV

Design of lexical analyser, Software tools for program development YACC and LEX.

Functions of parser, Parsing techniques, Top-down and Bottom-up parsing, Limitations of top-down parsing, Shift reduce and recursive descent parser, Operator precedence parser, Predictive parser, L-R parser, Syntax directed translation (design of parser not expected)

(10 Hrs, 20 Marks)

Unit – V

Symbol table organization and memory allocation, Elementary symbol table organization, Hash tables, Linked list and tree structure symbol tables, Memory allocation – static and dynamic memory allocation.

Dynamic linking in Windows (only introduction and concepts only) – concept of clipboard, OLE terminology and technology, Dynamic Data Exchange, Dynamic Link Libraries (DLL)

(10 Hrs, 20 Marks)

Reference Books -

1. John J. Donovan “System Programming”, TMH
2. Dhamdhere “System Programming & Operating System”, TMH, 2nd Ed
3. L. Beck “System Software”, Pearson, 3rd Ed
4. Aho, Ulman “Compiler Construction” – Pearson LPE
5. J P Bennett, “Compiling Techniques”, TMH
6. Dick Grune,”Modern Compiler Design” Wiley India.

7. David Galles,"Starting out with Modern Compiler Design" Dreamtech Press(Wiley India)

List of experiments -

1. Develop an application to simulate first pass of 2-pass assembler
2. Develop an application to simulate second pass of 2-pass assembler
3. Design a simple loader
4. Develop an application to create a simple text editor
5. Develop an application for simulating Lexical phase of Compiler
6. Develop an application for simulating Syntax Analysis phase of Compiler

The term work should include a minimum of five assignments.

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TERM – I

Advanced Development Tools Laboratory

Teaching Scheme:
Practical: 4 Hrs / Week

Examination Scheme:
Term Work: 50

Part I: Windows Programming
Basic Windows SDK programming, Programming involving Dialog Boxes, Menus and standard GUI components, Writing of Windows Help file using "HC", Writing DLLs and VXDs (Win 95/98/2k)

Part II: Front-End Tools
Assignments based on packages like C# / .NET / VC++ / VB / Java. Assignments should cover basic GUI components, Database Access, ActiveX technology, Network applications.

Part III: Internet Programming Tools
HTML programming, Java Scripts or VB Scripts programming, Internet programming using Java / C# / .NET, (Assignments should cover dynamic page creation) database connectivity (e.g. search engine), online communication (e.g. chatting, email-editor)

Reference Books -

1. Charles Petzold "Programming Windows", Microsoft Press, 5th Ed
2. Andrew Troelson,"C# and .Net Platform, A Press (Wiley India)
3. Herbert Schildt, "Programming Windows 2000 – Ground Up", Tata McGraw Hill
4. Schurman and Pardi, "Dynamic HTML in Action", Microsoft Press, 2nd Ed
5. Sells, "Windows Forms Programming in Visual Basic .NET", Pearson
6. Deitel, "C# How to program", Pearson LPE
7. Steven Hozner," Java 2(Jdk 5) Progg. Black Book" Dreamtech Press(Wiley India)
8. Ivor Horton,"Beginning VC++" Wrox Press(Wiley India)
9. Steven Hozner ," VB.Net Progg. Black Book" Dreamtech Press(Wiley India)
10. Bakharia, "Microsoft C# fast and easy web development", PHI
11. Steven Hozner ,"HTML Black Book" Dreamtech Press(Wiley India)
12. Eric Brown,"Windows Forms in Action" Manning Press(Wiley India)

Term work -

Term work should include at least four assignments from each part.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING)
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TERM – II

Microprocessor III

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Unit – I
Architecture of the 80386: Functional DIP, Support for pipelining, Dynamic bus sizing, 80386 SX/DX differences, Programming model of 80386, Register model, Data types and addressing modes, New instructions of 80386, Bus cycles with 16 & 32 bit, Data bus with timing state diagram, INTA, HOLD, HALT and reset cycles.

(10 Hrs, 20 Marks)

Unit – II
Operating Modes and Memory Management: Segmentation, Paging, (Real, Protected and VM86 mode), Debugging support.

(10 Hrs, 20 Marks)

Unit – III
Privilege Levels: Privilege level protection (Call gates, Conforming code segments) in protected and VM86 mode.
Multitasking: TSS, Moving between tasks, Task scheduling, Busy bit, NT bit, Back link field, TS bit, Extension to TSS, I/O permission bit map, Changing privilege levels within a task, Changing LDTs.

(10 Hrs, 20 Marks)

Unit – IV
Faults and Interrupts: Exception processing in Real, Protected and VM86 Mode.

80387 NDP: Register set, Number system, Instruction Set, Programming.
Processor to co-processor interface, Difference among 80387, 80287, 8087

(10 Hrs, 20 Marks)

Unit – V
Study of 80386 and 80486 motherboard (block diagram treatment only), Overview of Intel Chipset, Pentium motherboards – PI to PIV (block diagram treatment only)

Pentium Microprocessor: Introduction, Salient features, System architecture, MMX architecture
Introduction to Pentium II, III, IV (block diagram treatment only)

(10 Hrs, 20 Marks)

Reference Books -

1. James Turley “Advanced 80386 Programming techniques”, Tata McGraw Hill
2. Triebel, “Advanced 80386”, Tata McGraw Hill
3. Uffenbeck, “ the 80x86 Family: Design, Prog & Interfacing, 3/e”- Pearson LPE

4. Brey/Sarma, “The Intel Microprocessors-Architecture, Programming and Interfacing”, Pearson LPE
5. Douglas Hall, “Microprocessors and Interfacing”, Tata McGraw Hill
6. Badri Ram, “Advanced Microprocessors and Interfacing”, Tata McGraw Hill
7. Nelson, “The 80386 Book”, Microsoft Press
8. Hans Peter, “The Indispensable Pentium”, Pearson LPE
9. Murray Pappas, “The 80386 Programming Reference Manual”
10. B Govindarajalu, “IBM PC Clones”, Tata McGraw Hill, 2nd Ed.
11. James Antonakos, “The Pentium Microprocessor”, Pearson
12. Korneev n kiselev,”ModernMicroprocessors”,3rd edition,Dreamtech Press(WileyIndia)
13. Jeff Duntemann,”Assembly Language Progg. For IBM PC Family, 3rd edition,Dreamtech (Wiley India)

List of experiments -

Assembly language programming for 80386/80387

1. Generation of sine/cosine wave
2. Switching from real mode to protected mode and back
3. Solving arithmetic expression
4. 64 bit Arithmetic operations
5. Program using NDP

Study of 386, 486, Pentium motherboards

1. Layout of motherboard and minimum peripherals
2. Study of CMOS setup
3. Installation of peripherals
4. PC diagnostics using diagnostic tools
5. Study assignment on any latest GUI application or mini-project.

The term work should include a minimum of Six assignments.

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TERM – II

Operating Systems

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Oral: 25

Unit – I

Introduction: Need of OS, Evolution of OS, Types of OS like Batch, Timesharing, Multiprogramming, Multitasking, Real-time and Personal OS.
OS Views and Concepts: Shell command language, system calls, user view, OS components, OS structure like monolithic, layered, kernel based, micro-kernel based, virtual machine.
Process and Process management: Process concepts, interleaved CPU and IO operations, CPU burst, Process states, OS services for process management, threading.

(10 Hrs, 20 Marks)

Unit – II

Scheduling: Process scheduling, schedulers – long term, middle term and short term. Scheduling algorithms and performance evaluation.

Inter-process communication and synchronization needs: Mutual exclusion, semaphores, critical regions and monitor. Classical problems in concurrent programming.

(10 Hrs, 20 Marks)

Unit – III

Deadlock: Principles, detection, prevention, avoidance and recovery with Bankers algorithm.

Process management in UNIX: Structure of process, process control, process system calls – fork, join, exec, system boot (No algorithms).

Memory Management: Types, contiguous and non-contiguous, segmentation and paging concepts.

(10 Hrs, 20 Marks)

Unit – IV

Virtual memory management: Concepts, implementation, allocation, fetch and replacement.

Memory management in Unix: Policies, swapping and demand paging

File management: Organization, concepts, files and directories, hierarchical structures, space allocation, free space management

Security and protection: Overview, goals of security and protection, security and attacks, formal and practical aspects of security, authentication and password security.

(10 Hrs, 20 Marks)

Unit – V

File management in Unix: Internal representation of files, inodes

File structure in Unix: Structure of file and directories, super block, inode assignment to a new file. Allocation of disk blocks, file creation, and pipes. (No algorithms)

Mass storage structures, disk scheduling, disk management and swap space management.

Distributed OS: Concepts, design issues and system models.

(10 Hrs, 20 Marks)

Reference Books -

1. Silberschatz, Galvin, Gagne, “Operating System Concepts”, 7th Ed,Wiley India
2. D.M. Dhamdhere, “Operating Systems”, Tata McGraw Hill, 2nd Ed.
3. Milenkovic, “Operating Systems Concepts and Design”, Tata McGrawHill
4. M.J. Bach, “The design of Unix Operating System”, Pearson LPE
5. Tenenbaum, “Modern Operating Systems”, Pearson, 2nd Ed
6. William Stallings, “Operating systems-Internals and design principles”, Pearson LPE/PHI, 5th Ed.
7. Deitel, “Operating systems”, Pearson, 2nd Ed
8. Paul Love, “ Beginning Unix”, Wrox Press, (Wiley India)

List of experiments -

1. Study of Unix / Linux commands.
2. Implementation of command interpreter using system calls
3. Simulation of windows explorer
4. Implantation of CPU scheduling algorithm
5. Implementation of Memory Management algorithms – best fit, first fit, worst fit
6. Simulation of page replacement algorithm
7. Implementation of Bankers algorithm
8. Implementation of Inter process communication
9. Implementation of threading
10. Installation of Unix/Linux/Windows server installation with configuration of web-mail and proxy server systems

The term work should include a minimum of six assignments.

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TERM – II

Software Engineering

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Oral: 50

Unit – I
Introduction: What is and why software engineering? Product: Evolving role of software, Software Characteristics, Components, Applications, Software crisis and Myths, Software Engineering Process, Software development phases and Software Process Models, Prototyping and RAD Model, Water fall, Incremental Model, Spiral Model,4 GT Model, CASE tools.

(10 Hrs, 20 Marks)

Unit – II
Planning and Managing Software projects:

People, Problem and Process, Measures, Metrics and Indicators, Metrics for software quality, Scoping, Software Project Estimation, Make by decision, Software Acquisition Software risks - Identification, Projection, Assessment, Monitoring Project Scheduling and tracking tasks/Work break down structures, Time line charts, Project plan, CASE tools.

System Engineering: Computer based system, System engineering hierarchy.

Information engineering: Information strategy, Planning Enterprise modelling, Business area analysis, Information flow modelling, Product engineering, System analysis, Feasibility study, Economic and Technical feasibility analysis, Modelling system architecture diagram, CASE tools.

(10 Hrs, 20 Marks)

Unit – III
Requirement Analysis: Communication Techniques, FAST, Quality deployment, Analysis Principals: Modelling, partitioning, Prototyping, Specification,

SRS and SRS review analysis models: Data modelling, Functional modelling, Information flow, Data flow Diagrams, Extension to real time systems, Behavioural models, Mechanism of structural analysis, E-R diagrams, controlled modelling, Data dictionary, CASE tools.

(10 Hrs, 20 Marks)

Unit – IV
Design Fundamentals: Software Design and software design process, principals and concepts, Abstractions, Refinement and modularity, Software architecture, Control hierarchy, Partitioning, Data structure, Information hiding, Effective modular design,

Cohesion, coupling, Design Model, Design documents, CASE tools

Design Methods: Architectural design and design process, transform and transaction flow, design steps, interface design, procedural design, graphical and tabular design notations.

(10 Hrs, 20 Marks)

Unit – V

Software Testing Techniques and Strategies: Software testing fundamentals, Test case design, White box testing, Black box testing, Control structure testing, Strategic approach to testing, Strategic issues, Unit testing, Integration testing, Validation testing, System testing, CASE Tools

Introduction to OOSE.
Introduction Unified Modeling Language (UML)

(10 Hrs, 20 Marks)

Reference Books -

1. Pfleeger," Software Engineering : Theory & Practice",6th Edition-Pearson LPE
2. Pressman, "Software Engineering", McGraw Hill, 6th Ed
3. Peters," Software Engineering" Wiley India
4. Ghezzi, Jazayeri, Mandrioli, "Fundamentals of Software Engineering", Pearson/PHI, 2nd Ed
5. Sommervile, "Software Engineering", Pearson, 7th Ed
6. Rajib Mall, "Fundamentals of Software Engineering", PHI, 2nd Ed
7. Javadekar, "Software Engineering" Tata McGraw Hill
8. Thayer ,"Software Engineering Project Management "2nd edition, Wiley India
9. Tian ,"Software Quality Engineering" 2nd Edition, Wiley India

Term Work-

The term work should include a minimum of four software mini projects covering problem definition, analysis, design and documentation for each.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Database Management System

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Practical: 25

Unit – I

Introduction to DBMS: Basic concepts, advantages of a DBMS over file processing system, Data abstraction, Data models and data independence, components of a DBMS and overall structure. Database terminology

Database administration issues: DBA role, indexes. Data dictionary, security, backups, Replication, SQL support for DBA, commercial RDBMS selection

Data modeling: Basic concepts, types of data models, E-R data model and Object oriented data model, relational, network and hierarchical data models and their comparison, E-R and ERR diagramming.

(10 Hrs, 20 Marks)

Unit – II

Relational Model: Basic concepts, attributes and domains, interaction and extensions of a relation, concept of integrity and referential constraints. Relational query languages (relational algebra, relational calculus), concepts of view and trigger

(10 Hrs, 20 Marks)

Unit – III

SQL: Structure of a SQL query, DDL and DML, SQL queries, set operations. Predicates and join membership, tuple variables, set comparison, ordering of tuples, aggregate functions, nested query. Database modification using SQL, Dynamic and embedded SQL and concepts of stored procedure, Query optimization

(10 Hrs, 20 Marks)

Unit – IV

Relational database design: Need of normalization, Notation of a normalized relation, Normalization using functional dependency, Multi-valued dependencies and join dependency, 1NF, 2NF, 3NF, BCNF, 4NF.

Transaction Management: Basic concepts of transaction, components of transaction management (concurrency control, Recovery system), Different concurrency control protocols such as Time stamps and locking, different crash recovery such as log based recovery and shadow paging, concepts of cascaded abort, Multi-version concurrency control methods.

(10 Hrs, 20 Marks)

Unit – V

Object oriented DBMS: Review of object oriented concepts: Objects, Classes, attributes, Messages, Inheritance, and Polymorphism etc. Object schemas, Class subclass relationships, inter-object relationships, features of object oriented DBMS and ORDBMS, concepts of OID, persistence of objects in OODBMS, Physical organization, object-oriented queries, schemas modifications, Temporal databases, Active databases.

(10 Hrs, 20 Marks)

Reference Books -

1. Singh," Database Systems: Concepts,Design & Apllication"- Pearson LPE
2. Kahate, " Introduction to Database Management Systems"- Pearson LPE
3. Henry F. Korth, Abraham silberschatz, "Database system concepts", 5th Ed.Mc Graw Hill Inc.
4. Date, "Introduction to Database Management Systems", 8/e Pearson LPE.
5. Rajesh Narang, "Database Management System", PHI
6. Elmasri, Navathe, Somayajulu, Gupta, "Fundamantals of Database Systems", Pearson
7. ISRD, "Introduction to Database Management System", Tata McGraw Hill
8. Connolly, " Database Systems" – Pearson LPE.
9. Bipin Desai, "Introduction to database management systems", Galgotia.
10. Renu Vig, "Fundamentals of database management systems", ISTE learning materials centre
11. Phillip Pratt, "Concepts of DBMS", Thomson Learning, 3rd Ed.
12. Phillip Pratt, "A Guide to SQL", Thomson Learning, 5th Ed.
13. V.K.Jain, " Database Management System" Dreamtech Press (Wiley India)
14. Oracle Sql,Pl/Sql for 9i and 10 g, Dreamtech Press(Wiley India)

15. Andy Oppel, " Rational Databases-Principles and Fundamentals, Dreamtech Press(Wiley India)
16. Paul Wilton," Beginning SQL" Wrox Press, (Wiley India)

List of experiments -

1. Creating a sample database application using conventional file processing mechanism and "C" language. The program should provide facilities for retrieving, adding, deleting and modifying records
2. Prepare an E-R diagram for the given problem definition. Prepare and verify a relational database design using concepts of normalization techniques in appropriate normal form.
3. Creating a sample database file and indexes (for the design made in experiment No. 2) using any client server RDBMS (oracle/Sybase) package using SQL DDL queries. This will include constraints (key reference etc.) to be used while creating tables.
4. SQL DML queries: Use of SQL DML queries to retrieve, insert, delete and update the database created in experiment No. 3. The queries should involve all SQL features such as aggregate functions, group by, having, order by, sub queries and various SQL operators.
5. PL/SQL: Fundamentals of cursors, stored procedures, stored functions.
6. Screen design and Report generation: Sample forms and reports should be generated using Developer 2000 (in case of Oracle) or through Power builder or Visual basic front end tools or any prototyping software engineering tool.
7. Prototype of OODBMS/ Active database/ Temporal Database in C++

The term work should include a minimum of six assignments.

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TERM – II

Analysis and Design of Algorithms

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Unit – I
Introduction: Role of algorithms in computing, algorithm analysis, complexity issues, designing algorithms, algorithm strategies, methods for designing algorithms

(10 Hrs, 20 Marks)

Unit – II
Divide and Conquer method: Binary search, merge sort, quick sort, Starssen's matrix multiplication. Probabilistic analysis and randomised algorithms: The hiring problem, indicator random variables, randomised algorithms, probabilistic analysis.

(10 Hrs, 20 Marks)

Unit – III
Back tracking: Eight Queens Problem, graph coloring, Hamilton cycles, Knapsack problem, Maze Problem.
Branch and Bound: Traveling salesman's problem, lower bound theory-comparison trees for sorting/searching, lower bound on parallel computation.

(10 Hrs, 20 Marks)

Unit – IV

Advanced Design And Analysis Techniques: Dynamic Programming: Elements of dynamic programming, multistage graph, optimal binary search tree(OBST), 0/1 knapsack problem, Traveling salesman problem

Greedy Algorithms: Elements of greedy algorithms, Theoretical foundation of greedy methods, Job sequencing optimal merge patterns

(10 Hrs, 20 Marks)

Unit – V

NP hard and NP complete Problem: Algorithm complexity, Intractability, Non-deterministic Polynomial times(NP),Decision problems, Cook's theorem.

NP-Complete Problems: Satisfiability Problem, vertex cover problem.

NP-Hard problems: code generation Problems, Simplified NP hard problems, approximation algorithm for NP-hard problems.

(10 Hrs, 20 Marks)

Reference Books -

1. Aho , "Design & Analysis of Computer Algorithms"- Pearson LPE
2. Russ Miller ," Algorithms: Sequencial and Parallel" Dreamtech Press(Wiley India)
3. Goodrich ," Algorithm Design: Foundation and Analysis, Wiley India.
4. Grama , "An Intro to Prarallel Computing : Design & Analysis of Algorithms, 2/e, "- Pearson LPE
5. Baase , " Computer Algorithms: Intro to Design & Analysis, 3/e,"- Pearson LPE
6. Thomas H. Cormen and charles E.L. Leiserson, " Introduction to Algorithm", PHI, 2nd Ed
7. Horowitz/Sahani, "Fundamentals of Computer Algorithm", Galgotia, Reprint 1994
8. A.V. Aho and J.D. Ullman, "Design and Analysis of Algorithms", Pearson LPE.
9. Bressard, Bratly, " Fundamentals of Algorithm", Pearson LPE/PHI
10. Simon Harris, " Beginning Algorithms" Wrox Press (Wiley India)

Term Work -

The term work should consist of minimum six lab assignments covering the above syllabus.

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TERM – I

Practical Training/Mini Project/Special Study

Examination Scheme:
Term Work: 25

Every student needs to complete following requirements for term work of Practical Training / Special Study / Mini Project.

Practical training in any industry for a period of minimum two weeks and submit training report certified by personnel manager or works manager or any other higher authority of that industry.

OR

Special study on a recent topic from reported literature and submit a report on it

OR

One mini Theoretical or development project and submit a report on it.

Notes:

1. Practical training is to be undergone in summer vacation after SE and / or in winter vacation after first term of TE.
2. Report should be typed on A4 size paper and two copies paper bounded are to be prepared, one copy for the candidate, and one for the library.