Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,

AURANGABAD

Revised Syllabus of SE (CSE/IT)

Effective from 2017-18

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Faculty of Engineering and Technology
Board of Studies in Computer Science and Engineering
Curriculum Structure of SE (Computer Science and Engineering/Information Technology)
Effective from 2017-18

PART-I

Sub Code	Semester-I	Contact Hrs/Week				Examination Scheme						Duration of The Theory Examination
	Subject	**L**	**T**	**P**	**Total**	**CT**	**TH**	**TW**	**PR**	**Total**	**credits**	
BSH201	Engineering Mathematics -III	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE202	Data Structures	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE203	Computer Networks	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE204	Digital Electronics	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE205	Linux Operating System	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE221	Lab 1: Data Structures	--	--	2	2	--	--	--	50	50	**1**	
CSE222	Lab 2: Computer Networks	--	--	2	2	--	--	50	--	50	**1**	
CSE223	Lab 3: Digital Electronics	--	--	2	2	--	--	50	--	50	**1**	
CSE224	Lab 4: Linux Operating System	--	--	2	2	--	--	--	50	50	**1**	
CSE225	Lab 5: Introduction to Web Programming	--	--	4	4	--	--	--	50	50	**2**	
	Total	**20**	**--**	**12**	**32**	**100**	**400**	**100**	**150**	**750**	**26**	

PART - II

Sub Code	Semester-II	Contact Hrs/Week				Examination Scheme						
	Subject	**L**	**T**	**P**	**Total**	**CT**	**TH**	**TW**	**PR**	**Total**	**Credits**	**Duration of The Theory Examination**
BSH251	Engineering Mathematics-IV	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE252	Discrete Mathematics	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE253	Object Oriented Programming	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE254	Microprocessor & Computer Organization	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE255	Computer Graphics	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
CSE271	Lab 6: Object Oriented Programming	--	--	2	2	--	--	--	50	50	**1**	
CSE272	Lab 7: Microprocessor & Computer Organization	--	--	2	2	--	--	--	50	50	**1**	
CSE273	Lab 8: Computer Graphics	--	--	2	2	--	--	50	--	50	**1**	
CSE274	Lab 9: Open Source Lab	--	--	2	2	--	--	--	50	50	**1**	
BSH275	Lab 10: Communication Skills- I	--	--	4	4	--	--	50	--	50	**2**	
	Total	**20**	**--**	**12**	**32**	**100**	**400**	**100**	**150**	**750**	**26**	
	Total of Semester I & II	**40**		**24**	**64**	**200**	**800**	**200**	**300**	**1500**	**52**	

L: Lecture hours per week **T**: Tutorial hours per week **P**: Practical hours per week

CT: Class Test, **TH**: University Theory Examination, **TW**: Term Work, **PR**: Practical/Oral Examination

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Second Year Engineering (CSE/IT)
Semester – I

Course Code: BSH 201 **Engineering Mathematics-III**

Teaching scheme **Examination scheme**

Theory: 4 hrs / week Class Test: 20 Marks

Credit: 4 Theory Examination: 80 Marks

Theory Examination (Duration): 03 Hours

Objectives:

- To develop Logical understanding of the subject.
- To develop mathematical skill so that students are able to apply mathematical methods & Principle's in solving problems from Engineering fields.
- To produce graduates with mathematical knowledge & computational skill.

CONTENTS

SECTION-A

Unit 1: Linear Differential Equations **[8 hrs.]**

Linear Differential Equations with constant coefficients General method, shortcut methods to find particular integral, Homogenous Linear differential equations (Cauchy's & Legendre's form), method of variation of parameters.

Unit 2: Application of Linear Differential Equations **[6 hrs.]**

Application of Linear Differential Equations to Electrical circuits & to Mechanical system (Analogous study of two systems), to Civil Engineering, Free oscillations/vibrations, forced oscillation /vibrations, Damped Free oscillations / vibrations, Damped Forced oscillations / vibrations.

Unit 3: Fourier Transform **[6 hrs.]**

Fourier Transform, Fourier sine and cosine transform, Fourier integral, Fourier sine and cosine integral.

SECTION-B

Unit 4: Statistics & Probability **[8 hrs.]**

Measures of central Tendency and Measures of Dispersion (for grouped data only), Karl Pearson's coefficient of skewness, Probability distribution for random variables, Binomial and Normal Distributions, Regression and Correlation.

Unit 5: Vector Differentiation **[6 hrs.]**

Differentiation of vectors, Gradient of scalar point function, Directional derivative, Divergence of vector point function, Curl of a vector point function. Irrotational and solenoidal vector field.

Unit 6: Vector Calculus (Integral calculus) [6 hrs.]

The line integral, Surface integral, volume integral, Gauss Divergence theorem, Stoke's theorem, Green's theorem (All theorem without proof).

Text Books:

1. P. N. Wartikar and J. N. Wartikar, "A Text Book of Engineering Mathematics" (Volume-I, II, III) Pune Vidyarthi Griha Prakashan, Pune.
2. B. S. Grewal, "Higher Engineering Mathematics," Khanna Publications, New Delhi.
3. H. K. Das, "Advanced Engineering Mathematics," S. Chand & Company.

Reference Books:

1. B.V. Ramana, "Higher Engineering Mathematics," (Tata McGraw- Hill).
2. Erwin Kreyszig **,** **"**Advanced Engineering Mathematics," Wiley Eastern Ltd.
3. Ravish R Singh, Mukul Bhat, "Engineering Mathematics," A Tutorial Approach, Mc Graw Hill
4. S.C Gupta and V.K Kapoor, "Fundamentals of Mathematical Statistics, S. Chand and Sons

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6). Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 and 6 be made compulsory and should have at least EIGHT bits of two marks out of which FIVE to be solved.
4. Two questions from remaining questions from each section be asked to solve having weightage of 15 marks.

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Second Year Engineering (CSE/IT)
Semester – I

Course Code: CSE202 | **Title: Data Structures**

Teaching Scheme
Theory: 4 Hours/Week
Credit: 4

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration): 03 Hours

Prerequisite:
1. Computer Fundamental-1
2. Computer Fundamental-2

Objectives:
1. To impart basic concepts of Data Structures
2. To understand and implement various linear and non-linear data structures
3. To study applications of data structures
4. To understand and implement various searching and sorting techniques

CONTENTS

SECTION-A

Unit 1: Introduction to Data Structure [6 Hours]

Introduction to theory of data structure and its data types, Primitive and non-primitive data structure, Abstract data structure. Array: one dimensional and two dimensional arrays, Array as ADT, operations on Array. Structure and Union. Pointers: Basic concepts, Static and dynamic memory allocation. Algorithm and its characteristics.

Unit 2: Stack and Queue [7 Hours]

Stack, operations on stack, implementation of operations on stack using array, applications of stack: expressions conversion from infix, prefix to postfix, evaluation of postfix expression.
Queue, operations on Queue, applications of queues, Implementation of queue using array, Circular Queue.

Unit 3: Linked List [7 Hours]

Linked list, singly linked list, circular linked list, doubly linked list. Operations on linked list : create, insert, delete, search ,update. Application of Linked List: Polynomial Addition, Implementation of stack and queue using Linked list.

SECTION-B

Unit 4: Trees [7 Hours]

Definition, Basic Terminology, Tree Representation and implementation, Binary tree and traversal techniques, Binary Search Tree, AVL tree.

Unit 5: Graphs [7 Hours]

Definition, Basic Terminology, Graph Representation and implementation, Graph traversal techniques: BFS, DFS, Application of graph: Shortest Path problem

Unit 6: Searching and Sorting [6 Hours]

Linear and Binary Search, Bubble sort, Insertion sort, Selection sort, Heap sort.

Text Books:

1. Horowitz, Sahni, Anderson-Freed, "Fundamentals of Data Structures in C," 2nd Edition, Universities Press, 2007
2. Yedidyah, Augenstein, Tannenbaum, "Data Structures Using C and C++," 2nd Edition, Pearson Education, 2003.

Reference Books:

1. Richard F. Gilberg and Behrouz A. Forouzan, "Data Structures A Pseudocode Approach with C," Cengage Learning, 2005
2. G. A. V. Pai, "Data Structures and Algorithms", Mc Graw Hill Education

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each, will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions, 15 marks each.

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Semester – I

Course Code: CSE203 **Title: Computer Networks**

Teaching Scheme **Examination Scheme**

Theory: 4 Hours/Week Class Test: 20 Marks

Credit: 4 Theory Examination (Marks): 80 Marks

Theory Examination (Duration): 03 Hours

Prerequisite:

1. Computer Fundamentals
2. Data Communication

Objectives:

1. To learn and understand various Networking Protocols & Layers.
2. To understand functioning of a complete network.
3. To study most widely used computer network technologies in detail: Ethernet, TCP/IP.

CONTENTS

SECTION-A

Unit 1: Introduction [06 Hours]

Uses of Computer Networks, Networks, network types, Internet History, Network hardware, Transmission Media: Twisted pair, coaxial cable, fiber optics cable, Devices: Repeater, hub, switch, bridge, router and gateway, Networks Software, Protocol layering, TCP/IP protocol suite, OSI model.

Unit 2: Physical Layer **[**06 Hours]

Data and signals, digital signals, transmission impairment, data rate limits, performance, Digital-to-Digital conversion (line coding, line coding schemes), Digital-to-Analog Conversion: ASK, FSK, PSK, Multiplexing, switching (Three Methods of Switching, Switching and TCP/IP Layers), Circuit-switched networks, Packet switching.

Unit 3: Data-Link Layer **[**08 Hours]

Nodes and links, services, two categories of links, two sublayers, link-layer addressing, DLC services: Framing, Flow control, Error detection and correction: types of errors, redundancy, detection versus correction, block coding,cyclic codes: Cyclic Redundancy Check(CRC), Media Access Control (MAC): Random access (ALOHA, CSMA, CSMA/CD, CSMA/CA), Ethernet Protocol, Standard Ethernet, Fast Ethernet (100 Mbps), Gigabit Ethernet.

SECTION-B

Unit 4: Network Layer **[**08 Hours]

Network-layer services, packet switching, network-layer performance, IPv4 addresses, forwarding of IP packets, Internet Protocol (IP), ICMPv4, routing algorithms: Distance-Vector Routing, Link-State Routing, Path-Vector Routing, Congestion Control: General principles of congestion control, congestion control in Virtual Circuit, congestion control in Datagram, Internetworking: concatenated virtual circuit, connectionless internetworking

Unit 5: Transport Layer **[**06 Hours]

Transport-Layer Services, Transport-Layer Protocols: Services, Port Numbers, User Datagram Protocol UDP): User Datagram, UDP Services, UDP Applications, Transmission Control Protocol(TCP) : TCP Services, TCP Features, Segment, A TCP Connection, State Transition Diagram, Windows in TCP, Flow Control, Error Control, TCP Congestion Control, TCP Timers

Unit 6: Application Layer **[**06 Hours]

World Wide Web and HTTP, File Transfer Protocol (FTP), Electronic Mail, Domain Name System (DNS).

Text Books:

1. Forouzan B, "Data communication and Computer Networks", 5th Edition, Tata McGraw Hill.
2. Andrew S. Tanenbaum, "Computer Networks", 5th Edition, Pearson Education

Reference Books:

1. William Stallings, "Data and Computer Communication", 8th Edition, Pearson Education, 2007.
2. Larry L. Peterson & Bruce S. Davie, "Computer Networks: A Systems Approach", 4th Edition, Morgan Kaufmann Publishers
3. Forouzan B, "TCP/IP Protocol Suite", 4th Edition, Tata McGraw Hill.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each, will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions, 15 marks each.

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Second Year Engineering (CSE/IT)
Semester – I

Course Code: CSE204 **Title: Digital Electronics**

Teaching Scheme **Examination Scheme**

Theory: 4 Hours/Week Class Test: 20 Marks

Credit: 4 Theory Examination (Marks):80 Marks

Theory Examination (Duration):03 Hours

Prerequisite:

1. Basics of analog and digital signals.
2. Basic semi-conductor devices' operation.
3. Basics of Boolean algebra.

Objectives:

1. To understand different methods used for the simplification of Boolean functions.
2. To design and implement combinational circuits.
3. To design and implement synchronous and asynchronous sequential circuits.
4. To understand working of Conversion Circuits.

CONTENTS

SECTION-A

Unit 1: Number System: **[6 Hrs.]**

Binary number system, Signed binary numbers, Binary arithmetic, Decimal number system, Hexadecimal number system, Octal number system, Arithmetic operations using 1's complement, 2's complement, 9's complement, 10's complement.
Codes: Numeric codes, Weighted and non-weighted codes, Sequential codes, Self-complimenting codes, cyclic codes, Reflective codes, BCD code, Excess-3 code, Gray code.

Unit 2: Introduction to analog and digital signal **[6 Hrs.]**

Introduction to analog and digital signal, Characteristics of analog and digital signals, Logic gates and switching functions, Basic gates: AND, OR, NOT, Derived Gates: EX-OR, EX-NOR, Universal Gates: NAND, NOR. Introduction to logic family RTL, ECL, TTL, I^2L, CMOS, Characteristics of: TTL, CMOS. Representation of logic equation using logic gates.

Unit 3: Boolean Logic: **[8 Hrs.]**

Boolean Algebra Rules**,** De Morgan's theorem, Boolean algebra, Representation of logic functions using standard POS and SOP form, Minimization logic functions using - Karnaugh map (2,3,4 variable).

Combinational Circuit Design: Half and full adder, Half and full subtractor, Adder with Look ahead carry, BCD to 7- segment decoder, Binary to Gray code converter, Gray to Binary code converter.

SECTION-B

Unit 4: Data-Processing Circuits: [6 Hrs.]

Multiplexers, Demultiplexers, Decoders, Encoders, Exclusive-or Gates, Parity Generators and Checkers, Magnitude Comparator, Introduction to PLD, Realization of logic equation using Data Processing Circuits.

Unit 5: Clocks: [6 Hrs.]

Clock Waveforms, TTL Clock, Schmitt Trigger, **Flip-Flops:** Introduction to sequential logic circuits, One bit memory cell, flip – flops: S-R, J-K, D, T flip - flops, Clocked D FLIP-FLOP, Edge-triggered D FLIP-FLOP, Edge-triggered JK FLIP-FLOP, FLIP-FLOP Timing, JK Master-slave FLIP-FLOP, Flip-Flop Conversion.

Unit 6: Registers: [8 Hrs.]

Types of Registers, Serial In - Serial Out, Serial In - Parallel out, Parallel In - Serial Out, Parallel In - Parallel Out, Universal Shift Register, Applications of Shift Registers. **Counters:** Introduction to Counters, Types of Counters, Application of Counters, Designing of asynchronous and synchronous counters.

Text Books:

1. R. P. Jain, "Modern Digital Electronics", 3rd Edition, TMH publication, 2003.
2. Donald P Leach, Albert Paul Malvino & Goutam Saha, "*Digital Principles and Applications"*,7th Edition, TMH publication, 2011.

Reference Books:

1. Stephen Brown, Zvonko Vranesic, "*Fundamentals of Digital Logic Design with VHDL,"* 2nd Edition, Tata McGraw Hill, 2005.
2. Charles H. Roth, *Fundamentals of Logic Design, Jr*., 5th Edition, Cengage Learning, 2004.
3. Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss "*Digital Systems Principles and Applications,"* 10th Edition, Pearson Education, 2007.
4. M. Morris Mano: Digital Logic and Computer Design, 10th Edition, Pearson Education, 2008.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each, will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions, 15 marks each.

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Second Year Engineering (CSE/IT)
Semester – I

Course Code: CSE205 **Title: Linux Operating System**

Teaching Scheme
Theory: 04 Hours/Week
Credit: 4

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration): 03 Hours

Prerequisite:
1. Basic DOS command line operations & C programming
2. Moderate knowledge of Operating System

Objectives:
1. To understand basic of Linux Operating System.
2. To understand command line interface.
3. To get acquainted with Linux OS by understanding configuration and troubleshooting of Linux Operating System.

CONTENTS

SECTION-A

Unit 1: Introduction to Linux OS **[06 Hours]**

Introduction & types of OS, Interfaces of OS: CLI, GUI, Brief history of Linux, Architecture of Linux, Features of Linux, Difference between Linux and other OS, Linux Distributions, Boot process & run levels, Major application areas of Linux.

Unit 2: Linux Basics Usage **[08 Hours]**

User & password management & Logging into the system, GNOME and KDE desktop environment, Basic desktop operations, Text editors: vi and gedit, File system, File system architecture, File types, File attributes, File naming conventions, Shell as interpreter, Types of shell, Command line, Command syntax, Running commands and getting help, Basic commands, File-directory handling commands, Locating Files, File access permissions

Unit 3: Process Management in Linux **[06 Hours]**

Introduction of Processes, Processes creation & process lifecycle, Setting Priority to Processes, Running jobs in background, Job Scheduling Tools: At, Batch & Cron, Process States: Starting, Pausing and Resuming, Monitoring Processes, Killing Processes, Disk partition management: create, mount & resize portion, Use of meta-characters & regular expressions with grep, sed & awk.

SECTION-B

Unit 4: Network Configuration [06 Hours]

Introduction, Computer Networks and TCP/IP, Network Services and Files, Obtaining IP Addresses, Configuring Basic Network Services and Settings, The Linux Firewall, Writing Your Own Network Scripts, Sharing and Accessing Network Storage with SMB.

Unit 5: Server Installations, Shell Scripting [06 Hours]

Installation & Configuration of FTP server, Web server, Introduction to Shell Scripting, Variables Assignment and Parameters, Input and Output Selection Statements, Use of Loops, Arrays, String Manipulation, Functions in shell script.

Unit 6: Maintaining and Troubleshooting Linux [08 Hours]

Introduction to various types of backup media, Backup and restoring data using dump, restore, cpio & tar commands, Generating reports on system utilization (processor, memory, disk, and network), Study of Log Files, Recovering the super user password, Recovering the boot loader (GRUB), Troubleshooting network related problems, Disaster Planning and Recovery.

Text Books:

1. 'Linux the complete reference' by Richard Mathews, McGraw Hill Publication. Sixth Edition, 2008
2. 'Red Hat Linux: The Complete Bible' by Vijay Shekhar, Laxmi Publication, First Edition, 2006
3. 'Linux Troubleshooting Bible' by Christopher Negus, Thomas Weeks, Wiley Publication. First Edition 2006.

Reference Books:

1. 'Unix Concepts and Applications' by Sumitabha Das, McGraw Hill Publication. Fourth Edition, 2008
2. 'Linux with Operating System Concepts' by Richard Fox, CRC Press Publication. Second Edition , 2006

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each, will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions, 15 marks each.

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Second Year Engineering (CSE/IT)
Semester – I

Course Code: CSE221	**Title: LAB-I Data Structures**
Teaching Scheme	**Examination Scheme**
Practical: 2 Hours/Week	Practical /Oral Examination: 50 Marks
Credit: 1	Practical /Oral Examination (Duration): 03 Hours

Suggestive List of Practical's:

Design, develop and implement the following:

1. Perform arithmetic operations on two-dimensional Array using function.

2. Write a C program to maintain records of students using structure and pointers.

3. Write a C program to swap 2 values by using Call by value and Call by reference.

4. Write a C program to implement stack operation using dynamic array.

5. Design, develop, and execute a program in C to convert a given valid parenthesized infix arithmetic expression to postfix expression and then to print both the expressions. The expression consists of single character operands and the binary operators + (plus), - (minus), * (multiply) and / (divide).

6. Design, develop, and execute a program in C to evaluate a valid postfix expression using stack. Assume that the postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators are + (add), - (subtract), * (multiply) and /(divide).

7. Design, develop, and execute a program in C to simulate the working of a queue of integers using an array. Provide the following operations: a. Insert b. Delete c. Display

8. Design, develop, and execute a program in C to implement a singly linked list/doubly linked list where each node consists of integers. The program should support the following operations:
   a. Create a singly/doubly linked list by adding each node at the front.
   b. Insert a new node to the left of the node whose key value is read as an input.
   c. Delete the node of a given data if it is found, otherwise display appropriate message.
   d. Display the contents of the list.

9. Using circular representation for a polynomial, design, develop, and execute a program in C to accept two polynomials, add them, and then print the resulting polynomial.

10. Write a C program to implement Graph Traversal Techniques (DFS or BFS).

11. Write a C program to construct binary tree & binary tree traversal.

12. Write a C program to implement Linear and Binary Search.

13. Write a C program to implement Bubble Sort, Insertion and Selection sort.

14. Write a C program to implement Heap sort.

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

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Semester – I

Course Code: CSE222 **Title: LAB-II Computer Networks**

Teaching Scheme **Examination Scheme**

Practical: 2 Hours/Week Term Work: 50 Marks

Credit:1

Suggestive List of Practical's:

1. Fundamental components of data communication
2. Networking device: repeater, hub, switch, router and gateway
3. Transmission media: Guded and Unguided media
4. Creating Networking cable using crimping tool and study of RS232 standard
5. Case Study 1: Working of Physical Layer for a) Standard Ethernet, b) Fast Ethernet, c) Gigabit Ethernet, Understanding Encoding- Bit rate, modulation, topology, mode of communication (Simplex, Half Duplex, Full Duplex) for each of Ethernet generations.
6. Case Study 2: Working of Data Link Layer for a) Standard Ethernet, b) Fast Ethernet, c) Gigabit Ethernet, Understanding Data Link Layer: Framing, Physical Addressing, Flow and Error Control, MAC for each of Ethernet generations.
7. Creating workgroup of computers and resource sharing (file & printer) (Windows OS preferred)
8. Networking Commands: ifconfig, ping, tracert, netstat (Windows commands: pconfig, traceroute).
9. C Program for Routing Algorithm.
10. Any one of the following
    a. Wireshark tool for capturing and analyzing network traffic
    b. tcpdump command (Linux command) along with various options for capturing and analyzing network traffic.
11. FileZilla program for File Transfer Protocol.

Term Work:

Term work shall consist of record of the experiments carried out during the course, which should include neat labeled figures and appropriate explanation for the corresponding experiment indicating what is learnt from the experiment. The term work shall consist of 10 experiments.

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Second Year Engineering (CSE/IT)
Semester – I

Course Code: CSE223 **Title: Lab 3: Digital Electronics**

Teaching Scheme **Examination Scheme:**

Practical: 2 Hours/Week Term Work: 50 Marks

Credit: 1

Suggestive List of Practical's:

Design, develop and implement following:

1. Study and analysis of basic gates (using hardware kit).
2. Study & verification of operation of half and full Adder (using hardware kit).
3. Study & verification of operation of 8:1 MUX (using hardware kit).
4. Introduction to HDL. Design and implement Gray code to Binary Code Convertor using HDL.
5. Given a 4-variable logic expression, simplify it using Entered Variable Map and realize the simplified logic expression using HDL.
6. Design and implement 4:16 decoder using HDL.
7. Design and develop the HDL code for D Flip-Flop with positive-edge triggering. Simulate and verify it's working.
8. Realize a J-K Master / Slave Flip-Flop using HDL and verify its truth table.
9. Design and implement a 4-bit shift register using HDL and demonstrate its working.
10. Design and implement decade counter using HDL.

Term Work:

Term work shall consist of record of the experiments carried out during the course, which should include neat labeled figures and appropriate explanation for the corresponding experiment indicating what is learnt from the experiment. The term work shall consist of 10 experiments.

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Semester – I

Course Code: CSE224 **Title: Lab 4: Linux Operating System**

Teaching Scheme **Examination Scheme**

Practical: 2 Hours/Week Practical /Oral Examination: 50 Marks

Credit: 1 Practical /Oral Examination (Duration): 03 Hours

Suggestive List of Practical's:

Design, develop and implement the following:

1. Installation of Linux operating system using CD/DVD/USB drive or PXE boot
2. Execution of various file & directory handling commands
3. Execution of simple C and C++ programs using CC and GCC compiler
4. Install and test any local & network printer on Linux OS
5. Create, mount & resize partition on disk
6. Create user, group and assign various permissions to access a directory
7. Share a directory in LAN using SMB
8. Write a shell script program input-output statements and loops
9. Write a shell script program using array & case statement
10. Install & configure a web server for hosting an intranet website
11. Use of various text processing tools**:** grep & sed
12. Write a program in AWK using loops

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Second Year Engineering (CSE/IT)
Semester – I

Course Code: CSE 225 **Title: LAB-V Introduction to Web Programming**

Teaching Scheme
Practical: 04 Hrs/week
Credit: 2

Examination Scheme
Practical /Oral Examination: 50 Marks
Practical /Oral Examination (Duration): 03 Hours

Prerequisites:

1. You will need a text editor, such as Notepad and an Internet browser, such as Internet Explorer or Netscape.

Objectives - The student will be able to:

1. Define the basics in web design
2. Visualize and apply the basic concept of HTML.
3. Recognize the elements of HTML.
4. Define basics concept of JavaScript
5. Develop the web sites

Unit 1: Introduction to Web Design: **[4 hours]**

Web page & web site, Web Publishing, Introduction to HTML: Structure tags: <html>, <head>, <title>, <body> Block level tags: Headings, Paragraph, Comments, Breaks, Center, Division, Preformatted, Text alignment and font size. Text level tags: Bold, Italic, Underlined, Strike-through, superscript, subscript. Horizontal Rules Colours in web page: Background colour, Text colour, Link colour. Lists: Ordered Lists, Unordered Lists, Definition List, Nesting lists. HTML Links, Linking HTML Documents, Anchor tag, URLs

Unit 2: Tables and Forms **[4 hours]**

Tables: Creating Tables, Editing of rows and columns, rowspan, colspan, formatting tables using attributes border, Border colour, background, align, width, cell spacing and cell height.

Forms: Creating Forms, Forms controls: text controls, Password fields, Radio Buttons, Check boxes, Reset and Submit buttons.

Style sheets: Adding style sheet to document, Linking to a Style sheet, Embedding style sheet, Using inline Style sheet

Unit 3: JavaScript **[4 hours]**

JavaScript: Introduction, Variables, Operators, Arithmetic, Assignment, Data Types, Functions, Objects, Scope, Events, Strings, String Methods, Numbers, Number Methods, Math, Random, Dates, Date Formats, Date Methods, Arrays, Array Methods, Array Sort, Booleans, Comparisons, Conditions, Switch, Loop For, Loop While, Break, Type Conversion, Bitwise, Regular Expressions, Errors, Debugging.

Unit 4: JQuery and Bootstrap **[3 hours]**

JQuery: Syntax, Events, Slide, Animate;

Bootstrap: Framework Introduction, Forms, Buttons

Unit 5: AngularJS **[3 hours]**

AngularJS: Expressions, Modules, Data Binding, Controllers, SQL, DOM, Events, Forms and validation

Unit 6: XML **[2 hours]**

XML: embedding XML into HTML, DTD. Introduction to Content Management System: Wordpress, Joomla, Drupal overview, publish a website with any one CMS.

Text Books:

1. Castro, "HTML 4 for World Wide Web, 3rd ed. Pearson education, 1998.
2. Barrett, "Essential JavaScript for web professionals", Pearson Education, 2000

Reference Books:

1. Yong, "XML step by step", PHI
2. "WordPress 3 Complete - Create your own complete website or blog from scratch with WordPress" by April Hodge Silver, PACKT.
3. "Web Development with jQuery" by Richard York , WROX publication
4. "AngularJS"by Brad Green and Shyam Seshadri

Suggestive list of Practical's

- Design a home page which will display your information i.e Bio data.
- Create Hyperlinks in home page for educational details, Hobbies, Achievement, My Ideals etc
- Use table tag to format web page. Also display educational details in tabular format.
- Implement a CSS programs for layers, inline, internal and external style sheets
- Design signup form to validate username, password, phone numbers etc using Java script/AngularJS
- Design a sign up form information in database. Perform change password/AngularJS
- Develop and demonstrate a DHTML file that includes Javascript for the following problems
  Input: A number n obtained using prompt
  Output: The factorial of a number n
- Develop and demonstrate a DHTML file the includes JavaScript for using various menu items and submenu items
- Design a web page for your Department.
- Design and Develop a shopping cart using HTML and JavaScript
- Create a table to display time table of your class. ii) Use table tags to display library details iii) Use frames such that page is divided into 2 frames 40% on top to show contents of pages, 60% in bottom to show body of page. iv) use image tags also
- Write a JavaScript program to find the area of a triangle where lengths of the three sides is given
- Write a JavaScript program to determine whether a given year is a leap year in the Gregorian calendar.
- Write a JavaScript program to convert temperatures to and from celsius, fahrenheit.

- Write a javascript for handling events with jQuery.
- Use the animate() method to set the following CSS properties for :opacity: 0.4, height: 400px, width: 400px.
- Use the animate() method to set the font-size of to 100 pixels. The duration of the effect should be "slow".
- Implement a program, which takes User Id as an input and returns the user details by taking the user information from the XML document
- Create an XML document, which contains 10 users information.
- Publish a website with Wordpress
- Publish a website with Joomla,

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

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Second Year Engineering (CSE/IT)
Semester – II

Course Code: BSH 251 **Title: Engineering Mathematics-IV**

Teaching scheme **Examination scheme**

Theory: 4 Hours/Week Class Test: 20 Marks

Credit: 4 Theory Examination (Marks): 80 Marks

Theory Examination (Duration): 03 Hours

Objectives:

- To develop Logical understanding of the subject
- To develop mathematical skill so that students are able to apply mathematical methods & Principal's in solving problems from Engineering fields
- To produce graduates with mathematical knowledge & computational skill.

CONTENTS

SECTION-A

Unit 1:Laplace Transform **[6 hrs]**

Definition, Transforms of elementary functions, Properties & theorems of Laplace transforms (without proof), transforms of periodic function, Heaviside unit step function, displaced unit step function, Dirac delta function, error function, Bessel' function of zero order.

Unit 2: Inverse Laplace Transform and its Applications **[6 hrs]**

Inverse Laplace transforms by using (i) properties, ii) partial fractions, iii) Convolution theorem, Applications to solve linear differential equations with constant coefficients (Initial value problems), Simultaneous Linear differential equations.

Unit 3: Z Transform: **[8 hrs]**

Definition, Z transform of elementary functions, properties of Z transform, Inverse Z transform by using partial fraction and residues theorem, Solution of difference equation by Z transform.

SECTION-B

Unit 4: Numerical Methods and Curve Fitting **[8 hrs]**

Solution of transdental equations by Newton Raphson method, Gauss Seidel method to solve simultaneous linear equations, Lagranges interpolation formula for unequal intervals, numerical differentiation: Newton's forward and Newton's Backward difference formulae, Solution of ordinary differential equation by Eular modified Method and Runge-Kutta IVth order method, Curve fitting: Principle of least squares, Fitting of linear curve, parabola, exponential curve.

Unit-5: Function of Complex Variable (Differential calculus): [6 hrs]
Introduction, Analyticfunction Cauchy Riemann equations in Cartesian and Polar form, Harmonic function, Laurent's series (without proof), Conformal mapping: Translation, Magnification, Rotation and inversion bilinear transformation.

Unit 6: Function of Complex Variable (Integral calculus): [6 hrs]
Line integral, contour integral: Cauchy's integral theorem, Cauchy's integral formula Residues, Cauchy's residue theorem (All theorems without proof),

Text Books:

1. P. N. Wartikar and J. N. Wartikar, "A Text Book of Engineering Mathematics (Volume-I, II, III) " Pune Vidyarthi Griha Prakashan, Pune.
2. B. S. Grewal, "Higher Engineering Mathematics," Khanna Publications, New Delhi.
3. H. K. Das, "Advanced Engineering Mathematics," S. Chand & Company.

Reference Books:

1. B.V. Ramana, "Higher Engineering Mathematics," (Tata McGraw-Hill).
2. Erwin Kreyszig, "Advanced Engineering Mathematics," Wiley Eastern Ltd.
3. Ravish R Singh, Mukul Bhat, "Engineering Mathematics A Tutorial Approach," by,Mc Graw Hill

Pattern of Question Paper:
The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6). Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 and 6 be made compulsory and should have at least EIGHT bits of two marks out of which FIVE to be solved.
4. Two questions from remaining questions from each section be asked to solve having weightage of 15 marks

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Semester – II

Course Code: CSE252 **Title: Discrete Mathematics**

Teaching Scheme **Examination Scheme**

Theory: 04 Hours/Week Class Test: 20 Marks

Credit: 4 Theory Examination (Marks): 80 Marks

Theory Examination (Duration): 03 Hours

Prerequisites:

1. Basic knowledge of set theory
2. Fundamentals of probability
3. Preliminary concepts of encoding, decoding

Objectives:

1. To construct simple mathematical proofs and possess the ability to verify them
2. To understand logical arguments and logical constructs
3. Have a better understanding of sets, functions, and relations.
4. Possess the mathematical knowledge and maturity that are required for upper level computer.

CONTENTS

SECTION-A

Unit 1: Set Theory [5 Hours]

Sets and Subsets, Set Operations and the Laws of Set Theory, Counting and Venn Diagrams, Probability, Conditional probability, Permutation and Combination

Unit 2: Fundamentals of Logic: [11 Hours]

Basic Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference, The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems.

Unit 3: Properties of the Integers: [4 Hours]

The Well Ordering Principle – Mathematical Induction, Recursive Definitions

SECTION-B

Unit 4: Relations and Functions: [10 Hours]

Cartesian Products and Relations, Properties of Relations, Computer Recognition – Zero-One Matrices and Directed Graphs, Partial Orders – Hasse Diagrams, Lattice, Equivalence Relations

and Partitions, Functions – Plain and One-to-One, Onto Functions – Stirling Numbers of the Second Kind, Special Functions, The Pigeon-hole Principle, Function Composition and Inverse Functions

Unit 5: Groups and Rings: [5 Hours]

Definitions, Examples, and Elementary Properties, Homomorphisms and Cyclic Groups, Cosets and Lagrange's Theorem, Rings and Modular Arithmetic: The Ring Structure – Definition and Examples, Ring Properties and Substructures

Unit 6: Coding Theory: [5 Hours]

Elements of Coding Theory, The Hamming Metric, The Parity Check, and Generator Matrices, Group Codes: Decoding with Coset Leaders, Hamming Matrices

Text Book:

1. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics", 5th Edition, Pearson Education, 2004.

Reference Books:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 7th Edition, McGraw Hill, 2010.
2. Jayant Ganguly, "A Treatise on Discrete Mathematical Structures", Sanguine-Pearson, 2010.
3. D.S. Malik and M.K. Sen, Discrete Mathematical Structures: Theory and Applications, Cengage Learning, 2004.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each, will be compulsory. From the remaining questions in section A and B students are supposed to solve any two questions, 15 marks each.

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Semester – II

Course Code: CSE 253 **Title: Object Oriented Programming Using C++**

Teaching Scheme
Theory: 04 Hours/Week
Credit: 4

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration): 03 Hours

Prerequisite:

1. Fundamental knowledge about computers.
2. Computing knowledge
3. Basics of programming paradigms/constructs.

Objectives:

1. To study and understand the object oriented programming concepts and methodology
2. Be able to build C++ classes using appropriate encapsulation and design principles.
3. Be able to solve computational problems using C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.

CONTENTS

SECTION-A

Unit 1: Getting Started **[06 Hours]**

Need of Object-Oriented Programming (OOP), Object Oriented Programming Paradigm, Basic Concepts of Object-Oriented Programming, Benefits of OOP, C++ as object oriented programming language ,Different data types, operators, expressions, and statements, arrays and strings, pointers & user-defined types. Function Components, argument passing, inline functions, function overloading, recursive functions

Unit 2: Classes and Objects **[06 Hours]**

Specifying a Class, Defining Member Functions, A C++ Program with Class, Making an Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within a class, Memory Allocation for Objects, Static Data Members, Static member functions, Arrays of Objects, Objects as Function Arguments, Friendly functions, Returning Objects.

Unit 3: Constructors and Destructors **[08 Hours]**

Introduction, Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructors and Destructors.

Operator Overloading and Type Conversions: concept of overloading, Rules for Overloading Operators, Overloading Unary Operators, Overloading Binary Operators, Data Conversion, Type casting (implicit and explicit), Pitfalls of Operator Overloading and Conversion, Keywords explicit and mutable.

SECTION-B

Unit 4: Inheritance **[08 Hours]**

Base Class and derived Class, Public and Private Inheritance, protected members, Constructors Destructors and Inheritance -When Constructor and Destructor functions Are executed, Passing Parameters to Base-Class Constructors. Overriding Member Functions, Class Hierarchies, Levels of Inheritance, Multiple Inheritance, Ambiguity in Multiple Inheritance, Aggregation, Classes within Classes. Virtual Base Classes.

Virtual functions and Polymorphism:

Introduction to Pointers, Pointer to objects, this pointer, Pointer to derived classes, Virtual functions, Calling a Virtual Function Through a Base Class Reference ,The Virtual Attribute Is Inherited ,Virtual Functions Are Hierarchical ,Pure Virtual Functions ,Abstract Classes ,Early vs. Late Binding .

Unit 5: Managing Console I/O Operations **[06 Hours]**

Introduction, C++ Streams, C++ Stream Classes, Unformatted I/O Operations, Formatted Console I/O Operations, Managing Output with Manipulators

Working with Files:

Introduction, Classes for file stream operations, Opening and Closing of a File, File Modes, File pointers and their Manipulations, Sequential Input and Output Operations, Error Handling during file operations, Command line arguments

Unit6: Templates **[06 Hours]**

Introduction, Class templates, Class Templates with multiple parameters, Function templates, Overloading of Template Functions, Member Function Templates.

Exception handling:

Introduction, Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism, Rethrowing an exception, Specifying exceptions

Text Books:

1. "Object Oriented Programming with C++" by E Balagurusamy (6th Edition, McGraw Hill Pvt Ltd.) ISBN-13:978-1-25-902993-6.
2. "Object-Oriented Programming in C++", Robert Lafore ,fourth edition, Sams Publishing, ISBN:0672323087 (ISBN 13: 9780672323089)
3. "The Complete Reference C++" by Herbert Schildt (5th Edition, McGraw Hill Pvt Ltd.) ISBN-13: 978-0071634809

Reference Books:

1. *"C++ Programming Language"* by Bjarne Stroustrup (4th Edition, Addison Wesley) ISBN-13: 978-0321563842
2. *"Mastering C++"* by K.R.Venugopal, Rajkumar, T.Ravishankar (2nd Edition, McGraw Hill Pvt Ltd.) ISBN-13:978-93-83286-77-5.

PATTERN OF QUESTION PAPER:

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For 80 marks Paper:

1. Minimum ten questions
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Semester – II

Course Code: CSE254 **Title: Microprocessor and Computer Organization**

Teaching Scheme
Theory: 04Hours/Week
Credit: 4

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration): 03 Hours

Prerequisite:
1.Digital Electronics
2.Logic Design
3.Programming concept

Objectives:
1. To learn the architecture and assembly language programming 0f 8086 Microprocessor.
2. To provide in depth knowledge to the students about the design and organization of a digital computer, operation of various functional units, instruction set design and factors that influence the performance of a computer

CONTENTS

SECTION-A

Unit 1: Introduction to Microcomputers **[08 Hours]**
Introduction to 16-bit microprocessor, Architecture and Pin diagram of 8086/8088, Programming model of 8086/8088 (Registers), Minimum and Maximum mode, Segmentation, logical to physical address translation, even and odd memory banks, Read write cycle timing diagrams

Unit 2: 8086 Assembly Language Programming I **[08 Hours]**
Addressing modes, Instruction set of 8086 in detail, Instruction Formats, Stacks, Assembly Language Programming, Assembler, Linker, Debugger (Turbo debugger), Directives, Procedures (Near and Far), Macros, Loop constructs, 8086 Programming examples.

Unit 3: 8086 Assembly Language Programming II **[04 Hours]**
8086 Interrupt Structure, Interrupt Vector Table (IVT), ISR, Hardware and software Interrupts, BIOS and DOS Interrupts. Concepts of PSP, .EXE & .COM files, Concepts of TSR.

SECTION-B

Unit 4: Computing and Processor Basics **[08 Hours]**
A brief history of computers, Von Neumann Architecture, Generation of Computer, Classification of Computers, Functional components of a computer, Interconnection of components,

Performance of a computer, CISC and RISC architectures.

Unit 5: Data Path and Control Design [08 Hours]

Processing Unit: Organization of a processor - Registers, ALU and Control unit, Data path in a CPU, Instruction cycle, Organization of a control unit - Operations of a control unit.

Unit 6: Memory and System Organization [04 Hours]

Computer Sub system: Memory Subsystem: Semiconductor memories, Memory cells - SRAM and DRAM cells, Organization of a memory unit, Access of I/O devices, I/O ports, Serial port, Parallel port, PCI bus, SCSI bus, USB bus, I/O peripherals - Input devices, Output devices, Secondary storage devices.

Text Books:

1. Micro Processor and Interfacing, D.V.Hall, Tata McGraw-Hill, 2nd edition 2006.
2. Advanced Micro Processors, A.K. Ray and K.M.BhurChandi, TMH, 2nd Edition 2006.
3. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002.
4. C. Hamacher, Z. Vranesic and S. Zaky, "Computer Organization", McGrawHill, 2002
5. Peter Abel, ”Assembly language programming”, Pearson Edu,5th Edition,2002

Reference Books:

1. J. Uffenbeck, 80x86 Family: Design, Programming, and Interfacing, Prentice Hall, 2003.
2. Barry B. Brey, the Intel Microprocessors: 8086/8088, 80186, 80286, 80386, 80486, Pentium, Pentium Pro, and Pentium II, 5th ed., Prentice-Hall, 2001.
3. David A. Patterson, John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, 2nd ed., Morgan-Kaufman publisher, 2002.
4. Allen Wyatt, Using Assembly Language, Que Corporation, 1992

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For 80 marks Paper:

1. Minimum ten questions
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FACULTY OF ENGINEERING AND TECHNOLOGY
Second Year Engineering (CSE/IT)
Semester – II

Course Code: CSE255 | **Title: Computer Graphics**

Teaching Scheme
Theory: 4 Hours/Week
Credit: 4

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration): 03 Hours

Prerequisite:

1. Computer programming skills in C programming language
2. Basic understanding of use of data structures
3. Basic Mathematical concepts related to matrices and geometry

Objectives:

1. Introduce the students to graphics fundamentals
2. Make them aware of 2-D and 3-D graphics primitives
3. Provide the programmer's perspective of working of Computer Graphics using OpenGL
4. Know the basics of multimedia applications

CONTENTS

SECTION-A

Unit 1: Introduction to Computer graphics [8 Hours]

Introduction to Computer Graphics, Applications of Computer Graphics, CRT, Flat panels, Graphics Primitives, Raster scan and Random scan displays, Display Processor, Display file structure, Graphical Input and output devices , Rasterization , Line drawing algorithms: DDA and Bresanham's, Midpoint Circle Algorithm, Polygon filling -Scan converting polygons, Fill algorithms, Boundary fill algorithm, Flood fill algorithm

Unit 2: The OpenGL [6 Hours]

The OpenGL API; Primitives and Attributes, Color, Viewing, Control Functions, The Gasket program, Polygons and Recursion, The 3 Dimensional gasket, Plotting implicit functions

Unit 3: Input and Interaction [6 Hours]

Logical classification of input devices ,Physical devices used for interaction – keyboard, mouse, trackball, spaceball, tablets, light pen, joy stick, touch panel, data glove; Keyboard, Mouse interaction in OpenGL, Display lists and Modeling, Programming event driven Input, Menus, Implementing GUI in OpenGL

SECTION-B

Unit 4: Geometric Objects and Transformations **[**8 Hours]
Scalars, Points and Vectors, Coordinate Systems and Frames, Affine Transformations, Translation, Rotation and Scaling, Transformations in Homogeneous Coordinates, Concatenation of Transformations, OpenGL Transformation Matrices, Interfaces to 3-Dientional applications.

Unit 5: Viewing [6 Hours]
Classical and Compute Viewing , Viewing with a computer, Positioning of the Camera, Simple Projections, Projections in OpenGL, Parallel and Perspective projections ,Window to Viewport transformation, Setting window and viewport in OpenGL. Hidden surface removal: Depth comparison, Z-buffer algorithm, Back face detection, Area-subdivision algorithm

Unit 6: Clipping [6 Hours]
Clipping operations, Point clipping Line clipping; Cohen Sutherland algorithm, Midpoint subdivision algorithm, Cyrus beck algorithm; Polygon clipping , Sutherland Hodgman algorithm, Exterior clipping and text clipping

Text Books:
1. Hearn, Baker , " Computer Graphics (C version)" – Pearson Education
2. Edward Angel, "Interactive Computer Graphics A top- Down Approach with OpenGL", 5th Ed. Pearson Education.

Reference Books:
1. F. S. Hill, Stephen Kelly, "Computer Graphics using OpenGL", PHI 2009
2. David F. Rogers - Procedural Elements of Computer Graphics, Tata McGRAw Hill
3. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes – "Computer Graphics", Pearson Education, 1997
4. W. M. Newman, R. F. Sproull – "Principles of Interactive computer Graphics" – TMH

PATTERN OF QUESTION PAPER:
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For 80 marks Paper:
1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each, will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions,
15 marks each.

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Semester – II

Course Code: CSE271 **Title: LAB-6 Object Oriented Programming Using C++**

Teaching Scheme	**Examination Scheme**
Practical: 02 Hours/Week	Practical /Oral Examination: 50 Marks
Credit: 1	Practical /Oral Examination (Duration): 03 Hours

Suggestive List of Practical's:
Design, develop and implement the following:

1. Develop programs to implement the concepts of classes and object, accessing members: e.g**.**
   a. Design an EMPLOYEE class to contain
      Data members: Employee_Number, Employee_Name, Basic_Salary, All_Allowances, IT, Net_Salary.
      Member functions: to read the data of an employee, to calculate Net_Salary and to print the values of all the data members.
   b. Design a STUDENT class
   c. Design Bank Account class.

2. Design a program to Demonstrate concept of
   a. **Arrays within a class, Arrays of Objects** (e.g Develop program to calculate best of two class Test marks of six subjects of a student)
   b. **Objects as Function Arguments, Returning Objects**. (e.g. Complex number arithmetic)

3. Design a C++ program for static members
   a. Design a class having static member function which has capability to display number of objects created.
   b. Design matrix and vector classes with static allocation and a friend function to do matrix-vector multiplication.

4. Design a program to Demonstrate concept of constructor. Create a class called 'TIME' that has:
   a. three integer data members for hours, minutes and seconds
   b. constructor to initialize the object to zero
   c. constructor to initialize the object to some constant value
   d. member function to add two TIME objects
   e. member function to display time in HH:MM:SS format

   Write a main function to create two TIME objects, add them and display the result in HH:MM:SS format.

5. Design a program to demonstrate operator overloading for unary as well as binary operation.
   a. Design, develop and execute a program in C++ to create a class called DATE with methods to accept two valid dates in the form dd/mm/yy and to implement the

following operations by overloading the operators + and -. After every operation, the results are to be displayed by overloading the operator <<.

i. no_of_days = d1 – d2; where d1 and d2 are DATE objects, d1 >=d2 and no_of_days is an integer.

ii. d2 = d1 + no_of_days; where d1 is a DATE object and no_of_days is an integer.

b. Design a class Complex which represents the Complex Number data type. Implement the following operations:

i. Constructor (including a default constructor which creates the complex number 0+0i).

ii. Overloaded **operator+** to add two complex numbers.

iii. Overloaded **operator*** to multiply two complex numbers.

iv. Overloaded << and >> to print and read Complex Numbers.

6. Design a program to demonstrate Single, multiple, multilevel, hybrid, hierarchical inheritance and Virtual base classes.

7. Design a program to implement Array of pointers, pointer to functions, pointer to objects.

8. Design a program to implement concept of Virtual functions:

a. Create a class called LIST with two pure virtual function store() and retrieve(). To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.

b. Create a base class called 'SHAPE' having

i. two data members of type double

ii. member function get-data( ) to initialize base class data members

iii. pure virtual member function display-area( ) to compute and display the area of the geometrical object. Derive two specific classes 'TRIANGLE' and 'RECTANGLE' from the base class. Using these three classes design a program that will accept dimension of a triangle / rectangle interactively and display the area.

9. File Handling

a. Develop a program to demonstrate Opening and Closing of file using constructors and open () function.

b. Write a program to read the class object of student info such as name, age, gender, height and weight from the keyboard and to store them on a specified file using read() and write() functions. Again the same file is opened for reading and displaying the contents of the file on the screen.

10. Develop a program to implement class and function template for stack and queue.

11. Design a program to demonstrate the concepts of catching and throwing of an exception.

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

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Semester – II

Course Code: CSE272 **Title: Lab 7: Microprocessor & Computer Organization**

Teaching Scheme	**Examination Scheme**
Practical: 02 Hours/Week	Practical /Oral Examination: 50 Marks
Credit: 1	Practical /Oral Examination (Duration): 03 Hours

Suggestive List of Practical's:
Design, develop and implement the following:

1. Arithmetic operations using 8086 instructions.
2. Study of BIOS and DOS interrupts.
3. BCD to HEX Conversion.
4. HEX to BCD Conversion.
5. String Operations.
6. Programs using Macros and Procedures.
7. Serial Communication using assembly language programming.
8. File handling using assembly language programming.
9. Reading and Writing disk sectors.
10. Assembly language programming using C programming language.
11. Study and implement TSR programming.
12. Accessing I/O ports using assembly language programming.

Practical Examination:
Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Second Year Engineering (CSE/IT)
Semester – II

Course Code: CSE273 **Title: LAB-8: Computer Graphics**

Teaching Scheme **Examination Scheme**

Practical: 2 Hours/Week Term Work: 50 Marks

Credit: 1

Suggestive List of Practical's:

Design, develop and implement following:

1. Study & implement of basic graphics functions defined in graphics.h"
2. Program for Line Drawing using DDA algorithm in C
3. Program for Line Drawing using Bresenham's algorithm in C
4. Program for Mid-Point Circle generation algorithm in C
5. Study and implementation of Basic Graphics Primitives in 'OpenGL'
6. Interactive program using Keyboard/Mouse in OpenGL
7. Interactive Program using Menu/ Submenu in OpenGL
8. Study and implementation of Display Lists in OpenGL
9. Program for 2-D transformations in OpenGL
10. Window to Viewport transformation in OpenGL
11. Implementation of Line Clipping Algorithm
12. Implementation of Polygon Filling Algorithm
13. Design an application in OpenGL.

Term Work:

Term work shall consists of record of the experiments carried out during the course, which should include appropriate explanation for the corresponding experiment indicating what is learnt from the experiment. The term work shall consist of at least 10 experiments.

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Semester-II

Course Code: CSE-274 **Title: LAB-IX Open Source Laboratory**

Teaching Scheme
Practical: 02 Hours/Week
Credit: 1

Examination Scheme
Practical /Oral Examination (Duration): 03 Hours
Practical Examination (Marks): 50 Marks

Prerequisite:

- Basic Knowledge of HTML, CSS, JS.
- Knowledge of programming constructs

Objectives:

This course is aimed to:

- Understand open source movement worldwide
- Enable competency in industry-problem identification and resolution
- Develop application using lampp/xampp

Unit 1: Apache and PHP

Introduction to Open source, 3-Tier architecture, Apache webserver, XAMPP/LAMPP, Basic syntax, Variables, Data Types, Operators and expressions, Constants. Flow Control: Switch flow, Loops, Code Block, Sending data to the browser. Working with Arrays: Arrays, Creating array, Array related Functions. Working with Function: Function, Calling Function, Defining Function, Returning the Values from user defined function, Variable Scope, Argument. Working with Strings, Date and Time Functions: Formatting String with PHP.

Unit 2: Forms and Session Handling

Working with Forms: Creating form, Handling form, Validating form data, Accessing form data, use of Hidden fields to save State, Redirecting user, file Upload and Sending Mail on Form Submission, Working with Cookies and User Session: Introduction of Cookie, Setting a Cookie with PHP, Introduction of Session and Improving Session Security, Starting a Session, Working with Session Variables, Passing Session Id in the query String, Destroying Session and Unsetting Variables. Error Handling and Debugging: General error types and debugging, displaying PHP errors, Adjusting Error Reporting, Creating Custom error handler, PHP debugging techniques

Unit 3: MySQLi.

Understanding the Database Design Process: The importance of good database design, Basic SQL Command: Table Creation, Insert row, Select Command Using Where Clause, Update and Delete Command, String Function, Date and Time Functions, Using MySQL with PHP: Connecting to MySQLi and selecting the database, executing simple queries, retrieving query results, counting return Records, updating, Record Addition, Viewing Record, and Deletion Record with PHP.
MYSQL Error Handling: SQL and MySQL debugging techniques.

Unit 4: PHP Data Object (PDO) functions.
Why PDO? , Connections and Connection management, Running Queries, Running SELECT INSERT, UPDATE, or DELETE statements, Getting data out of statement- foreach().Getting data out of statement-fetch().Error Handling.

Unit 5: AJAX
Introduction to Ajax, Pre-Ajax JavaScript Communication Techniques, Defining Ajax, The Ajax Toolkit, XMLHttpRequest Object, Data Formats, Developing an Ajax library, Networking considerations, user interface design for Ajax. Develop a dynamic website with PHP, MYSQLi, Ajax (login, registration, feedback, file uploading).

Reference Books:

1. Red Hat Linux Bible, Christopher Negus, Wiley Publishing ISBN: 0-7645-4333-4
2. PHP, MySQL and Apache, Julie C Meloni, Pearson Education ISBN: 81-297-0443-9
3. AJAX: The Complete Reference, Thomas Powell McGraw-Hill Education, ISBN-10: 007149216X

Internet Resources:
1. PHP Manual, http://php.net/
2. AJAX, http://w3schools.com/ajax/,http://tutorialspoint.com/ajax/
3. MySQLi, http://w3schools.com/mysql/, http://tutorialspoint.com/ajax/
4. Linux Course for Intermediate Level Users, http://www.linux.org/lessons/interm/index.html

Suggestive List of Practical's:

1. Demonstration of Open source software's installation i.e. xampp, lamp, etc.
2. Design HTML form and retrieve the values in PHP script.
3. PHP variables, arrays (array multiplication, addition ...etc).
4. PHP Functions: array, string, date-time, and calendar.
5. MySQLi connectivity, INSERT, SELECT, DELETE with PHP
6. PHP script using PDO for MySQLi connectivity, data storing and retrieval.
7. PHP Mysqli connectivity using OOP method.
8. PHP script for File uploading.
9. PHP script for-Session Management (login form).
10. AJAX Script using XMLHttpRequest, Data Formats, PHP.
11. PHP script to update and retrieve data stored in database from user using Ajax.
12. Chat Application using PHP, MYSQLi, and AJAX.
13. Miniproject: Design of website using PHP – MYSQLi, AJAX.

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Semester-II

Course Code: BSH 275 **Title: Communication Skills-I**
Teaching scheme **Examination scheme**
Practical: 04 hrs /week Term work / Oral Exam: 50 Marks
Credit: 2

The teacher shall explain in detail, the gist and techniques involved in the following work units to the students. The teacher shall subsequently formulate the exercises to adjudge the skill sets acquired by the students.

Unit 1 Time Management **[04 Hrs]**
Value of time, Diagnosing Time Management, Weekly Planner to do list and Prioritizing work.

Unit 2: Grammar and Usage **[08 Hrs]**
Overview of basic Mid-level English Grammar, Parts of speech, Preparations and Conditions, Tense and Concept of time, Sentence Construction (Concord), Vocabulary: Words, Idioms, Phrases, Antonyms and Synonyms

Unit 3: Speaking Skills **[08 Hrs]**
Training in Sound Recognition, the speech process, message, audience, speech style, feedback, conversation and oral skills, fluency and self-expression body language phonetics and spoken English, speaking techniques, word stress, correct stress patterns, voice quality, correct tone, types of tones, Presentation skills-planning, preparation, organization, Stress and Intonation pattern in spoken communication, Sound Recording Exercise (Language Lab Exercise), Communication Errors in English.

Unit 4: Listening and Reading Skills **[08 Hrs]**
Active and Passive Listening, the reading process, purpose, different kinds of texts, reference material, scientific and technical texts, active and passive reading, strategies-vocabulary skills, eye reading and visual perception, Skimming and scanning reading, drawing inferences and conclusions, comprehension of technical material- scientific and technical texts, instructions and technical manuals, graphic information. Note making- tool for study skills.

Unit 5: Writing Skills **[06 Hrs]**

Identification of different writing styles (Four Writing Style), Types of reports, information and analytical reports, oral and written reports, formal and non-formal reports, printed forms, letter and memo format, manuscript format, proposals, technical articles, journal articles and conference papers, Drafting: Memo, Circulars, Notices, agendas etc. E-mails, Business Memos / Letters, Employment Communication- resume design, resume style.

Unit 6 Developing Skills and Presentations **[06 Hrs]**

Developing key traits 1: creativity, critical thinking and problem solving. Effective Presentations-Gathering Information and Building Presentation. Presentation by students in team.

Text Books:

1. 'Effective Technical Communication' by M Ashraf Rizvi, Tata McGraw Hill Publishing Company Ltd.
2. 'Basic Managerial Skills for all' E. H. McGrath, Eastern Economy Edition, Prentice hall India.
3. 'Developing Communication Skills' Krishna Mohan, Meera Banerji, McMillan India Ltd.
4. Skills' Krishna Mohan, Meera Banerji, McMillan India Ltd.

Term Work:

Term work marks should be given on the basis of online test conducted internally at college level.