GOVERNMENT COLLEGE OF ENGINEERING, AURANGABAD

(An Autonomous Institute of Government of Maharashtra)

Department of Information Technology Engineering

Teaching and Evaluation Scheme

SE (Full-Time) in Information Technology Engineering

SEMESTER-I

THEORY COURSES													
S. No.	**Course Code**	**Subject**	**Scheme of Teaching (Hrs/Week)**			**Total Credits**	**Scheme of Evaluation (Marks)**					
			L	**T**	**P**		**Theory**			**Term Work**	**Practical/ Viva-voce**	**Total**
							Test	**TA**	**ESE**			
1	GE-241	Environmental Studies	03	-	-	03	20	20	60			100
2	GE-242	Engineering Mathematics	03	01	-	04	20	20	60			100
3	IT- 243	Digital Electronics	03	-	-	03	20	20	60			100
4	IT-244	Object Oriented Programming	04	-	-	04	20	20	60			100
5	IT-245	Data Communication and Networking	03	01	-	04	20	20	60			100
LABORATORY COURSES												
6	IT-246	Lab- Digital Electronics			02	01				25	-	25
7	IT-247	Lab- Programming in C			02	01				25	-	25
8	IT-248	Lab- Web Technology			04	02				50	25	75
9	IT-249	Object Oriented Programming			04	02				50	25	75
		Total	16	02	12	24	100	100	100	150	50	700

SEMESTER-II

THEORY COURSES													
S. No.	**Course Code**	**Subject**	**Scheme of Teaching (Hrs/Week)**			**Total Credits**	**Scheme of Evaluation (Marks)**					
			L	**T**	**P**		**Theory**			**Term Work**	**Practical/ Viva-voce**	**Total**
							Test	**TA**	**ESE**			
1	IT-258	I)Computer Ethics and Cyber Security	03	-	-	03	20	20	60			100

	IT-259	II)Computer Systems										
2	GE-253	Mathematics-IV	03	01	-	04	20	20	60			100
3	IT-251	Data Structure	03	01	-	04	20	20	60			100
4	IT-252	Computer Graphics	03			03	20	20	60			100
5	IT-253	DatabaseManagement System	04	-		04	20	20	60			100
LABORATORY COURSES												
6	IT-254	Lab- Data Structure			02	01				25	25	50
7	IT-255	Lab- Computer Graphics			02	01				25	-	25
8	IT-256	Lab-Database Management System			04	02				50	25	75
9	IT-257	Lab-Computer Workshop			04	02				50	-	50
		Total	16	02	12	24	100	100	300	150	50	700

L-Lectures, T-Tutorials, P-Practical, TA-Teacher Assessment, ESE-End-Semester Examination

IT 243: Digital Electronics

Teaching Scheme		**Evaluation Scheme**	
Lectures	3Hrs/Week	Test	20 Marks
Tutorials	0Hrs/Week	Teacher Assessment	20 Marks
Total Credits	3	End-Semester Examination	60 Marks

Course Educational Objectives:

- To train the students on fundamentals of Digital basics
- To train the students to lay a strong foundation for digital systems.
- To train the students on basic Design issues of processors

Course Outcomes Expected:

-Student will understand concepts of logic gates, Universal gates, map, Flip-flops.

-Student will able to design small circuitry

UNIT-1	**Number Systems and codes, Logic Gates, Boolean algebra** Number system and codes: Number systems, Binary number system, signed binary numbers, binary arithmetic, 2's complement arithmetic, octal number system, Hexadecimal number system, Gray code, Excess three codes, error detecting and correcting codes. Basic gates, Universal gates and their truth tables, De-Morgan's theorem.	5 Hrs
UNIT-2	**Combinational circuit design,** And **Sequential Logic Design, Flip-Flops:** Combinational Circuit Design : K-Map minimization using K-map , don't care condition, Binary half and full adders and subtractors, BCD to Seven Segment decoder, binary to gray and gray to binary conversion. Quine-McClusky minimization technique. Multiplexers, cascading of multiplexers, Demultiplexers, cascading of Demultiplexers, Binary and BCD Adders Flip-flops - One bit memory cell, Clocked SRFF, JKFF, D Type, T Type FF, Application of Flip-flops Introduction registers, shift registers, universal registers, application of shift registers, as ring counters, twisted ring counter	8 Hrs
UNIT-3	**Combinational Logic Design and Flip-Flops, Sequential Logic Design** Multiplexers, cascading of multiplexers, Demultiplexers, cascading of Demultiplexers, Binary and BCD Adders Flip-flops - One bit memory cell, Clocked SRFF, JKFF, D Type, T Type FF, Application of Flip-flops Introduction registers, shift registers, universal registers, application of shift registers, as ring counters, twisted ring counter	6 Hrs
UNIT-4	**Counters :**Ripple or Asynchronous Counters, Modulus of Counters, Introduction to general purpose 54/74 series, Asynchronous IC's, Cascading of ripple counter IC's, Synchronous counters, up/down counters	6 Hrs
UNIT-5	**Timing circuits**: Application of logic gates in timing circuits, OP AMP and its application in timing circuits, Schmitt trigger ICs, Monostable multivibrator ICs, 555 timer , A/D Conveter , D/A Converter , Examples of Digital Systems.	6 Hrs

TEXT BOOKS

1. R. P Jain, "Modern Digital Electronics", Tata Mcgraw Hill.

2. R. P. Jain & Thomas L. Floyd,"Digital Fundamentals", Pearson Education**2.** R. P. Jain & Thomas L. Floyd, "Digital Fundamentals", Pearson Education

3. D. P. Leach, A. P. Malvino, G. Saha ; Digital Principles & applications.

REFERENCE BOOKS:

1. John F. Wakerly; Digital Design (Principles & Practices).

IT 244: Object Oriented Programming

Teaching Scheme		**Evaluation Scheme**	
Lectures	4Hrs/Week	Test	20 Marks
Tutorials	0Hrs/Week	Teacher Assessment	20 Marks
Total Credits	4	End-Semester Examination	60 Marks

Course Educational Objectives:

-To train the students on fundamentals of Object Oriented Programming

- To train the students for a strong foundation for using these concepts in software development

Course Outcomes Expected:

- Student will understand concepts of Class and Objects.

-Student will understand concepts of Inheritance, polymorphism etc.

-Students will able to do some small projects by using c++

UNIT-1	**Introduction:** Advantages of OOPS language & development platform, program statements preprogramming directives, include directives, header files ,I/O statement variables, manipulators Introduction**,** Data types, Control statements(if-else, loops), switch case ,Arrays, Pointers, Functions, Structures	8 Hrs
UNIT-2	**Object and Classes:** Class as Data type, Basic concepts of oops, Specifying a class, Defining member functions, Array within a class, Memory allocation for objects, Static data and member function, Array of object, object as function argument	8 Hrs
UNIT-3	**Constructor and Destructor:** Concept of constructor, Its Types (default, parameterized, copy, dynamic), constructor overloading, Constructor with default argument, Destructor, Function overloading, Operator overloading (Overloading unary and binary operators, Overloading binary operators, multiple overloading)	8 Hrs
UNIT-4	**Inheritance and Polymorphism:** Derived class and base class-specifying the derived class, accessing base class member, Types of Inheritance (single, multilevel, multiple,Hierarchical,Hybrid) accessing specifies, Virtual base classes, Abstract Classes, Constructors in inheritance. Concept of Polymorphism, its Types Run time and compile time polymorphism, Concept of overloading and overriding. Storage.	8 Hrs
UNIT -5	**Files and Stream classes:** Streams-stream class hierarchy, stream classes-string I/O Writing strings, detecting end of file, character I/O Object I/O,I/O with multiple objects-the fstream class, "open" function-file pointers-specifying position, specifying the offset, the calling function, error handling-redirection-redirecting input, Manipulators.	8 Hrs

TEXT BOOKS

1. E. Balagurusamy; *Object Oriented Programming with C++, Third Edition, Tata McGraw Hill.*
2. K. R.Venugopal, Rajkumar B., T.Ravishankar; *Mastering C++, Tata McGraw Hill*.

REFERENCE BOOKS:

1. Bjarne Stroustrup; *C++ Programming Language, Pearson Education Asia.*
2. Scott Meyers; *More Effective C++; Addison-Wesley 1996*.
3. James Rumbaugh et al; *Object Oriented Modeling and Design, Pearson Education.*
4.Object oriented programming in Turbo C++ by David Parsons
Object oriented programming in Turbo C++ by V. Kanetkar

Reference Web Sites

1.www.cplusplus.com/doc/tutorial/
2. www.smartdraw.com/tutorials/software-uml/uml.html

245: Data Communication and Networking

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorial	1 Hr/Week	Teacher Assessment	20 Marks
Total Credits	4	End-Semester Examination	60 Marks

Course objectives:

1. To explore Data communication, Networking , Protocols and Standards and Networking Models
2. To discuss issues related to physical layer and transmission medium
3. To discuss services provided by data link layer. Implementation of these services in Local Area Networks and Wide Area Networks

Expected outcomes:

1. Students are expected to know about various protocols, models in networks.
2. Students are able to design, implement and analyze simple computer networks.
3. Identify, formulate and solve network-engineering problems.
4. Knowledge of contemporary issues in computer networks

UNIT-1 Introduction **05 Hrs** **6 Hrs**

Data Communication, Networks, Internet, Protocols and Standards, Network Models: OSI, TCP/IP, analog and digital data, analog signal, digital signal, transmission impairments, data rate limits, performance.

UNIT-2 Bandwidth Utilization and Transmission Media **05Hrs** **6 Hrs**

Signal Conversion: digital-to-digital, analog-to-digital, analog-to-analog, digital-to-analog conversion, multiplexing, spread spectrum, guided media and unguided media

UNIT-3 Switching and Error Detection - Correction **05Hrs** **6 Hrs**

Switching: circuit switched networks, datagram networks, virtual circuit networks, structure of types of errors, redundancy, detection vs correction, FEC vs retransmission, coding, modular arithmetic, block coding, linear block codes, cyclic codes, checksum, hamming code

UNIT-4 Data Link Control and Medium Access **05Hrs** **6 Hrs**

Framing, flow control and error control protocols, protocols: stop-and-wait, go-back-n, selective-repeat, piggybacking, HDLC and PPP. random access: ALOHA, CSMA, CSMA/CD, CSMA/CA, controlled access, channelization

UNIT-5 Ethernet , LAN and Virtual Circuit Networks **05Hrs** **6 Hrs**

IEEE standards, different Ethernets. connecting devices, backbone networks, VLAN. Frame Relay, ATM, ATM LANs

TEXT AND REFERENCE BOOKS:

1. BehrouzA. Forouzan, **Data Communications and Networking**, Tata McGraw Hill
2. Gilbert Held, **Understanding Data Communications Seventh Edition**, Pearson Education
3. AndrewS. Tanenbaum, **Computer Networks**, Prentice Hall
4. James F. Kurose and Keith W. Ross, **Computer Networking**- A Top-Down Approach, Pearson
5. Douglas Comer, **Network Systems Design using Network Processor**, Pearson Education
6. William Stallings, **High-Speed Networks and Internets**, Pearson Education

IT- 246 – LAB: Digital Electronics

Teaching Scheme:
Practical: 2 Hrs/week
Credits: 2

Examination Scheme:
Term work: 25
Practical/Viva:-

TERM Work:
The term work shall consist of a journal record of at least 10 experiments/ assignments
Assessment of term work should be done based on the points mentioned below:
- Continuous lab assessment
-Actually performing practical in the laboratory
-Oral Examination conducted (internally) at the time of submission

Suggestive List of experiments:

1. A) To study the logic gates & verify the truth table.
   (B) To realize the Universal Gates.
2. To study & verify the truth table for Half Adder
3. To study & verify the truth table for Full Adder
4. To study & verify the truth table for Half Subtractor
5. To study & verify the truth table for Full Subtractor
6. To study & verify the code conversion circuits Binary to Gray Code
7. To study & verify the code conversion circuit · Gray to Binary Code.
8. To study the following circuit and verify their truth table.
   ·16 to 1 line multiplexer.
9. To study the following circuit and verify their truth table
   1 to 16 line De-multiplexer
10. To study of flip-flops & prove truth tables.

IT- 247 – LAB: Programming in C

Teaching Scheme:
Practical: 2 Hrs/week
Credits: 1

Examination Scheme:
Term work: 25
Practical/Viva:-

Contents to be covered in practical's

UNIT-1 Introduction to C Language fundamentals, The C character set, variables and constants, data types, keywords, expressions, statements, operators- arithmetic operators , unary operators, relational & logical operators, conditional operators, type conversions , type casting.

UNIT-2 Conditional execution - if, nested if, it else, switch, goto statement, Loop execution - For loop, While loop, Do while loop, break, and continue statements. Functions - Defining a function, passing arguments to functions, returning values from function, command line arguments, Recursion, Local & Global variables concept.

UNIT-3 Arrays- definition, passing array to the function, Multidimensional array, String operation- String copy, String length, String concatenation, String compare. Introduction to structure and union. Array of structure, Passing structure as an object to function. Structure as an return type of function

UNIT-4 Pointers- pointer as a variable, pointer to array, pointer as argument to function. String operations using pointers. File handling - file handling modes, File open, File close, File input and Output Functions, End of file functions.

TERM Work:
The term work shall consist of a journal record of at least 10 experiments/ assignments
Assessment of term work should be done based on the points mentioned below:
- Continuous lab assessment
-Actually performing practical in the laboratory
-Oral Examination conducted (internally) at the time of submission

Suggestive List of experiments:

1. Simple program which shows use of scanf and printf
2. Program for showing use of Control Statements
3. Program By using Loops
4. Program to generate Fibonacci series and/or factorial of a number using recursive function
5. Program for dynamic memory allocation functions: malloc( ), calloc( ), and free( ).
6. Program to accept and display student information using structure.
7. Program to pass structure/array as a parameter to a function
8. Program to prepare monthly telephone bill
9. Menu driven program for matrix addition and subtraction
10. Program for matrix multiplication
11. Program to prepare salary bill of a company using files

IT- 248 – Web Technology

Teaching Scheme: **Examination Scheme:**

Practical: 4 Hrs/week Term work: 50

Credits: 2 Practical/Viva:25

Contents to be covered in Practical's

UNIT-1 **Introduction to web Technology**:
Basic concepts of web technology, different between website Design and Construction, Basic tags of Html ,div, giving title, formatting text, adding paragraphs, HR, BR tags, working with color and fonts. Importing images and adding background images, subscript, superscript, strike, ordered unordered list, Creating Tables and Frames.

UNIT-2 **Advances Concept in CSS :**ID, and class based CSS, CSS borders, border styles, padding and type sizing options in CSS, dynamic CSS menus, CSS layout two columns three columns . Scripting variables, operators, looping construct, decision construct, handling events, javascript entities

UNIT-3 **Apache and PHP:**: Installing Apache Web server, PHP: testing installation basics of PHP scripts, variables Data types, Operators and Constants, flow control functions, if statement, loops arrays, strings, Dates and times PHP GET and POST functions. Interacting with the File System and the Server, Session control in PHP, Exception handling in PHP.

UNIT-4 **Java Script and MySQL:**: Configuration MySQL server, working with MySQL Databases, MySQL Tables, Commands INSERT, SELECT, UPDATE, REPLACE, DELETE. Date and Time function MySQL.

UNIT-5 **Application Development:**Connecting to MySQL with PHP, Inserting data with PHP,retrieving data with PHP, Developing PHP scripts for dynamic web page like Feedback form, online admission form, online test.

TERM Work:

The term work shall consist of a journal record of at least 10 experiments/ assignments
Assessment of term work should be done based on the points mentioned below:
- Continuous lab assessment
-Actually performing practical in the laboratory
-Oral Examination conducted (internally) at the time of submission

Suggestive List of experiments:

1. Program using list, hyperlinks, and image maps.
2. Program using tables, Lists, Creating frames.
3. Creating forms using various available objects.
4. Creating forms using various available objects.
5. Creating Dynamic menu and various layout in CSS
6. Use of java script constructs loops and variables.
7. Event handling using java script.
8. Storing and retrieving data in PHP.
9. Writing functions in PHP.
10. Use PHP GET and POST functions.
11. Introduction to designing web database structure in MYSQL.

IT- 249 –LAB Object Oriented Programming

Teaching Scheme:
Practical: 4 Hrs/week
Credits: 2

Examination Scheme:
Term work: 50
Practical/Viva:25

TERM Work:
The term work shall consist of a journal record of at least 10 experiments/ assignments
Assessment of term work should be done based on the points mentioned below:
- Continuous lab assessment
-Actually performing practical in the laboratory
-Oral Examination conducted (internally) at the time of submission

Suggestive List of experiments:

1.] Implement program using Structure
2. Program which shows use class and Objects.
3. Program for Static Data Members and Member functions.
4. Program for friend function and inline function.
5. Write a program to demonstrate different types of constructors
6. Write a program for overloading various binary operators.
7. Write a program for overloading various unary operators.
8. Write a program for Multilevel and multiple inheritances.
9. Write a program for Hierarchical and hybrid inheritance.
10. Write a program for polymorphism (virtual function).
11. Program using manipulators.
12. Program for User Defined Manipulators
13. Program using streams
14. Program using files (open function method)
15. Program using files(constructor method)
16. Mini Project

Practical Examination:
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Institute Elective IT-258 Computer Ethics and Cyber Security

Teaching Scheme:
Lectures: 3 hrs/week
Tutorials :0
Total Credits: 03

Evaluation Scheme:
Test : 20 Marks
Teacher Assessment: 20 Marks
End-Semesters Examination: 60 Marks

Course Educational Objectives:

-To make students familiar with the fundamental concepts of computer ethics
- To know the linkage between computer, professional, philosophical ethics and decision making
- To develop the concepts in computer forensics
- To introduce the linkage between technology, law and ethics

Course Outcomes Expected:

-After completing Computer Ethics and Cyber Security, students should reflect on the humanitarian, social, and cultural impact of computer technology by focusing on ethical issues faced by and brought about by computing professionals, including those related to networking and the internet, intellectual property, privacy, security, reliability, and liability.
-changing attitudes toward work and wealth related to the open source phenomenon, as well as issues raised by the possible emergence in the future of highly intelligent machines.
-Student should understand the importance of laws, IT act and cyber security

UNIT-1 **Computer ethics and philosophical ethics:** 6 Hrs

What is Vacuum of policies, conceptual muddles, social context, moral and legal issues, uniqueness of ethical issues, role of analogy, descriptive and normative claims, ethical relativism, utilitarianism

Professional Ethics:

Characteristics, the system of professions, computing as a profession, professional relationships, responsibilities, code of ethics and professional conduct

Privacy: Computers and privacy issue, reframing this issue, legislative background, better privacy protection

UNIT-2 **Intellectual property issues in cyberspace** 6 Hrs

Introduction to intellectual property Protections via Copyright, Trade Secrets, Trademarks, Patents, Contracting to protect intellectual property, Protection options – Encryption, steganography, watermarking, copyright on web-content, copyright on software

Ethical Decision Making: Types of ethical choices, Making defensible decisions, Ethical dilemmas, law and ethics,

UNIT-3 **Crime incident Handling Basics**: 6 Hrs

Hacking, cyber activism, Tracking hackers, clues to cyber crime, privacy act, search warrants, common terms, organizational roles, procedure for responding to incidents, reporting procedures, legal considerations

Information Technology Act 2000

Scope, jurisdiction, offense and contraventions, powers of police, adjudication

UNIT-4 **Cyber Forensics** 6 Hrs

Cyber forensics, cyber crime examples, forensics casework, investigative incident-response actions, computer forensics tools, Threats in cyberspaces, Blended attacks

Sample Policy Documents: i) Antivirus Guidelines Policy ii) Internal Lab Security

Policy iii) Server Security Policy iv) Wireless Communications Policy

UNIT-5 **Information Security Certifications** 6 Hrs

CISSP and SSCP, CISA and CISM, SCP, GIAC, certification weaknesses, Role of these certified professionals

Text Books:

1. Deborah G Johnson, " *Computer Ethics*", Pearson Education Pub., ISBN : 81-7758-593-2.
2. Earnest A. Kallman, J.P Grillo, "*Ethical Decision making and IT: An Introduction with Cases",* McGraw Hill Pub.
3. John W. Rittinghouse, William M. Hancock, "*Cyber security Operations Handbook*", Elsevier Pub.
4. Michael E. Whitman, Herbert J. Mattord, "*Principles of Information Security",* 2nd Edition,, CengageLearning Pub.

Reference Books:

1. Randy Weaver, Dawn Weaver, "*Network Infrastructure Security*", Cengage Learning Pub

Website: http://www.emagister.in/ethical_hacking_cyber_security_courses-

IT-259 Computer Systems

Teaching Scheme:
Lectures: 3 hrs/week
Tutorials: 0
Total Credits: 03

Evaluation Scheme:
Test : 20 Marks
Teacher Assessment: 20 Marks
End-Semesters Examination: 60 Marks

Course Educational Objectives:

-To make students familiar with the fundamental concepts of computer organization
- To know the linkage between computer Memories,Peripherials

-Course Outcomes

Student will understand the structure as well as working of hardware of computers Systems
Student will understand the concept of RAID as well as concepts of memories.
Student will understand the concept of multiprocessing and Hazards.

UNIT-1 **Building Basics** Organization 4 Hrs
and Architecture, Structure and Function, Why computer organization and Architecture and Assessing and Understanding Performance, Top-level view of Computer Function.

UNIT-2 **Memory** 6 Hrs
Basic Structure of Memory Hierarchy, **Internal Memory:** Semiconductor main memory, Error Correction, Advanced DRAM, **External Memory:** Magnetic Disks, RAID, Optical Memory, Magnetic Tapes, **Exploiting Memory Hierarchy:** The Basics of Cache, Measuring and improving cache performance, A Common Frame work for memory hierarchies,
Fallacies and Pitfalls.
Case Study: P4 and AMD Operant Memory Hierarchy.

UNIT-3 **The Central Processing UNIT** 6Hrs
Computer Arithmetic's, Instruction Set Characteristics and Functions, Addressing modes and Formats, Structure and Functions, RISC, The Processor: Data Path and Control

UNIT-4 **I/O, Networks and Peripherals** 7Hrs
Disk Storage Dependability, Networks, Buses and Other Connections (between processors, Memory and I/O), Interfacing I/O Devices (to Processors, Memory and operating System), I/O performance Measures, Designing an I/O System, External Interfaces: Firewire and Infobahn. Case Study: A Digital Camera.

UNIT-5 **Pipeline and Instruction level Parallelism & Advanced Architectural Concepts** 7Hrs
Overview, A Pipelined Data Path, Pipelined Control, Data Hazards and Forwarding, Stalls, Brach Hazards, Exceptions Case Study: The Pentium 4 Pipeline. Parallel Processing: Multiple Processor organizations, symmetric Multiple processors, Cache Coherence and MESI protocol, Clusters, NUMA, and Vector Computation

TEXT AND REFERENCE BOOKS

1. David Patterson, John Hennessy "Computer Organization And Design", Third Edition, ELSEVIER publications.
2. William Stallings, "Computer Organization and Architecture", Sixth Edition 2003, Pearson Education.

IT 251: Data Structure

Teaching Scheme		Evaluation Scheme	
Lectures	3Hrs/Week	Test	20 Marks
Tutorials	1 Hrs/Week	Teacher Assessment	20 Marks
Total Credits	4	End-Semester Examination	60 Marks

Course Educational Objectives:

- To train the students on fundamentals that one must learn of data structures
- To train the students for a strong foundation for programming using data structures

Course Outcomes Expected:

1. To choose the appropriate data type for a given problem.
2. To implement the algorithms including various operations on Queues, Stacks, Linked Lists, Trees, Graphs, Sorting, Searching on real time applications.
3. Design and implement abstract data types such as linked list, stack, queue and tree by using the programming language using static or dynamic implementations.
4. Analyze, evaluate and choose appropriate data types and algorithms with respect to solve particular problems.

UNIT-1 **Sorting & searching** 8 Hrs

Different sorting tech, classification on the basis of big-O notation, tech such as straight selection sort, bubble sort, merge sort, quick sort, heap sort, shell sort, radix sort, comparisons between different sorting techniques

UNIT-2 **Introduction to data structure, The Stacks& Queues** 8 Hrs

The Arrays as an ADT: Using One-Dimensional Arrays, Using Two-Dimensional Arrays, Using Multidimensional Arrays, Definition and Examples, Primitive Operation, The stack as an ADT, The queue and its sequential representation, The queue as an ADT, Basic Definition and examples: Infix, Postfix, and Prefix, Program to evaluate a Postfix expression, Limitations of the program, Circular Queue, priority queue

UNIT-3 **Linear Data Structure & their representation :** 8 Hrs

Definition, concept, operation on linked lists, Circular linked lists
Doubly linked lists, Operations like insertion, deletion, insertion in order, searching, updating , Applications of linked lists such as polynomial manipulation, Comparison of singly linked, circularly linked & doubly linked list

UNIT-4 Definition, Basic terminology, operation on binary trees, linked storage representation for binary 8Hrs
search trees, Basic operation on binary search tree such as creating a binary search tree, searching, modifying an element, inserting & deleting the element, destroy a binary search tree, tree traversals ,in-order, pre-order, post-order , tree application for expression evaluation & for solving sparse Matrices, Sequential searching, binary searching, height balanced trees2-3 tree, B trees, B+ trees, AVL trees

UNIT-5 **Graph:** 8 Hrs

Definitions, basic terminology, matrix representation & implementation of graphs, graph travels, DFS, BFS, Shortest path, spanning tree

TEXT AND REFERENCE BOOKS

1. Yedidyah Langsam, Moshe J. Augenstein, Aaron M.Tenenbaum, “Data Structures using C and C++ “ , Pearson Pub.
2. Yashavant P Kanetkar, “Data Structures through C”, BPB Pub. (Book with CD)
3. G.S. Baluja, “Principles of Data Structures using C and C++”,
4. Ellis Horowitz, Sartaj Sahni, “Fundamentals of Data Structures”,
5. Robert L Kruse, “Data Structures and Program Design”, PHI

IT 252: Computer Graphics

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorial	0 Hr/Week	Teacher Assessment	20 Marks
Total Credits	3	End-Semester Examination	60 Marks

Course objectives:

Introduce the students to graphics fundamentals & make them aware of 2-D and 3-D graphics primitives
The course will consider methods for modeling 3-dimensional objects and efficiently generating photo realistic renderings on color raster graphics devices.
The emphasis of the course will be placed on understanding how the various elements that underlie computer graphics (algebra, geometry, algorithms and data structures, optics, and photometry) interact in the design of graphics software systems.
Study the GUI design methods & to introduce the programming principles of computer graphics, including fundamental data-structures and algorithms for rendering and modeling. The course will cover both practical programming through C, C++ and OpenGL, and mathematical and theoretical foundations.

Expected outcomes:

Student will able understand the concept of GUI
Student will do the programs based on the algorithm as DDA,Bresenham's
Student will able understand the concept of rendering and fractals.

UNIT-1 **Introduction and applications** 6 Hrs

What is Computer Graphics?, GUI Applications, Conceptual framework for CG. Display Devices: Random scan and raster scan monitors; color CRT, Plasma panel displays, LCD panels, 3-D viewing devices. Graphical Input Devices, Introduction to graphics standards (SRGP, PHIGS etc)
Line drawing algorithms: DDA and Bresenham's. Graphics primitives, Line functions, character attributes, properties of circle, Circle generating algorithm, filling rectangles, filling polygons

UNIT-2 **2-D Drawing Geometry and transformation** 6 Hrs

2-D transformations, homogeneous coordinates and matrix representation of 2-D transformations, other 2-D transformations: reflection and shear, window to viewport transformation, clipping in raster world, clipping lines, clipping polygons, text clipping and exterior clipping

UNIT-3 **3 D transformations/ User interface** 6 Hrs

3-D viewing: An introduction, Projections, 3-D transformations, matrix representation, composition of 3-D transformation, coordinate system
GUI and interactive input methods: The user dialogue, features of GUI: Windows and icons, accommodating multiple skill levels, consistency, minimizing memorization, backup and error handling, feedback. Logical classification of input devices, input functions, concurrent use of input modes, interactive picture construction techniques.

UNIT-4 **GRAPHICS PROGRAMMING** 6 Hrs

Color Models – RGB, YIQ, CMY, HSV, Animations, General Computer Animation, Raster, Keyframe - Graphics programming using OPENGL – Basic graphics primitives – Drawing three dimensional objects - Drawing 3D scenes

RENDERING

Introduction to Shading models, Flat and Smooth shading, Adding texture to faces, Adding shadows of objects, Building a camera in a program, Creating shaded objects, Rendering texture – Drawing Shadows.

UNIT-5 **FRACTALS** 6 Hrs

Fractals and Self similarity – Peano curves – Creating image by iterated functions –
Mandelbrot sets – Julia Sets – Random Fractals – Overview of Ray Tracing Intersecting rays with other primitives – Adding Surface texture – Reflections and
Transparency – Boolean operations on Objects

TEXT AND REFERENCE BOOKS

Text Books:

1.Donald Hearn and Baker, “Computer Graphics”, PHI Pub.
2. ISRD Group, “Computer Graphics”, Tata McGraw Hill Pub. , ISBN-0-07-059376-0.
3. F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education,2003.

Reference Books:

1. A P Godse , “Computer Graphics”, Technical pub., 3rd Revised Edition
2. J.D. Foley, A V Dam, “Computer Graphics, Principles and Practice”, Addison Wesley Pub.

IT 253: Database Management System

Teaching Scheme		Evaluation Scheme	
Lectures	4Hrs/Week	Test	20 Marks
Tutorials	0Hrs/Week	Teacher Assessment	20 Marks
Total Credits	4	End-Semester Examination	60 Marks

Course Educational Objectives:

- To understand the basics of Database Management System.
- To make students familiar with database normalization..
- To train students as they can write SQL/ PL-SQL Queries as per requirement of application.

Course Outcomes Expected:

- Students should be able to design and implement databases.
- Student should able to write SQL/ PL-SQL Queries as per requirement of application.

UNIT-1	**Introduction:** What is Database? Necessity of database? DBMS, Examples, Characteristics of the Database Approach, Advantage of using a Database Approach, Database System Architecture, Data Models, Schemes and Instances, Data Independence, Database Languages and Interfaces, Database System Environment, Classification of Database Management Systems. Database users and administrator.	6 Hrs
UNIT-2	**ER Models, Relational Models:** Different types of integrity constraints-Primary Key, Unique , Foreign key, Check, Not Null, Super key, Candidate Key, **E-R model**- Entity, Entity set, Strong and Weak entity ,Entity-Relationship Diagrams, Entity-Relationship Design Issues, Weak Entity Sets, Attributes- Simple, Derived, Composite, Multi valued, Identifier, Relationship, Associative entity, Cardinality constraints, Degree of relationship. E-R diagram naming conventions and design issues. Examples, Extended E_R Features. **Relational Models:-** the Relational Data Model, the Relational Algebra: Fundamental Relational-Algebra Operations, Additional Relational-Algebra Operations, Extended Relational-Algebra operations. ER-to-Relational Mapping	6 Hrs
UNIT-3	**SQL:**Background, Structure of SQL Queries, Data Definition language-Create, alter, Describe, Drop, Truncate clause, create table using Integrity constraints Select clause, Set Operations, Functions-single row functions-general, conversion, date, character, Multiple row functions - Aggregate Functions, Group by clause, Having clause, Nested Sub queries, Complex Queries, Views, Modification of the Data-DML-Insert, Update, Delete, Different types of joins **Advanced SQL :,** Authorization and transaction control SQL clauses, Embedded SQL, Introduction to PL/SQL-Cursor, triggers, Procedures.	6 Hrs
UNIT-4	**Database Designing and Storage:** **Relational Database Design**: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Decomposition Using Functional Dependencies, Decomposition using Multivalued Dependencies, More Normal Forms up to BCNF. **Storage and File Structure:** Overview of Physical Storage Media, Data-Dictionary Storage.	6 Hrs
UNIT-5	**Query Processing and Transaction Processing:** Overview of Query Processing, Measures of Query Cost, Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation. Transaction support in SQL Concurrency control techniques, concurrency control based on timestamp based protocol, validation based protocol, deadlock handling, Database Recovery Techniques based on	6 Hrs

Immediate Update, Failure classification, Shadow Paging, Log based recovery, failure with loss of Nonvolatile Storage.

TEXT BOOKS

1. Abraham Silberschatz and Henry Korth, Sudarshan : Database System Concepts, 5th Edition, ISBN : 0-07-120413X, Tata McGraw-Hill. Author, Title of the book, Publisher, Edition, Year of publication
2. Elmasri and Navathe : Fundamentals of Data base Systems (5th Ed.), Addison-Wesley, 1999.

REFERENCES

1 Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 2003.

2 Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- "Database System Implementation"- Pearson Education- 2000. 3. Peter Rob and Corlos Coronel- "Database System Concepts", Cengage Learning Edition 2008.

IT- 254– LAB: Data Structure

Teaching Scheme:
Practical: 2 Hrs/week

Examination Scheme:
Term work: 25
Practical/Viva: 25
Credits: 01

Course Outcomes Expected:

1. To implement the algorithms including various operations on Queues, Stacks, Linked Lists, Trees, Graphs, Sorting, Searching on real time applications.
2. Design and implement abstract data types with static or dynamic representation.
3. Analyze, evaluate and design appropriate data types and algorithms for solving particular problems.

TERM Work:

The term work shall consist of a journal record of at least 10 experiments/ assignments .
Assessment of term work should be done based on the points mentioned below:
- Continuous lab assessment
-Actually performing practical in the laboratory
-Oral Examination conducted (internally) at the time of submission

Suggestive List of experiments:

1. Program for Bubble Sort and Bucket Sort.
2. Program for Merge Sort and Heap Sort.
3. Program for Insertion Sort and Quick sort.
4. Program for Binary Search to search an element in the given sequence
5. Program to implement two stacks in the one array.
6. Program for implementing Stack and Queue.
7. Program for implementing Singly Linked List and Doubly Linked List.
8. Program for implementing Circular Queue using Linked List.
9. Program for Creation of Binary Tree and operations on it.
10. Program for Creation of Binary Threaded Tree.
11. Program for Depth First search and Breadth First search.

Practical Evaluation:

The Practical Evaluation consists of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of Evaluation is three hours.

IT- 255 – LAB: Computer Graphics

Teaching Scheme:
Practical: 2 Hrs/week

Examination Scheme:
Term work: 25
Practical/Viva: -
Credits: 01

TERM Work:
The term work shall consist of a journal record of at least 10 experiments/ assignments .
Assessment of term work should be done based on the points mentioned below:
- Continuous lab assessment
-Actually performing practical in the laboratory
-Oral Examination conducted (internally) at the time of submission

Suggestive List of experiments:

1. Write a program to draw a hut or another geometrical figures.
2. Write a program for DDA Line drawing Algorithm
3. Write a program for Bresenham's Line drawing Algorithm
4. Write a program for circle.
5. Write a program for ellipse
6. Write a program for polygon filling
7. Write a program for 2 D transformation
8. Write a program for 3 D transformation
9. Write a program for Line clipping Algorithm
10. Write a program to draw a hut or another geometrical figures
11. Write a program for DDA Line drawing Algorithm

IT- 256– LAB: Database Management Systems

Teaching Scheme:
Practical: 4 Hrs/week

Examination Scheme:
Term work: 50
Practical/Viva: 25
Credits: 2

TERM Work:
The term work shall consist of a journal record of at least 10 experiments/ assignments and Mini project based on the syllabus of the subject - DBMS.
Assessment of term work should be done based on the points mentioned below:
- Continuous lab assessment
-Actually performing practical in the laboratory
-Oral Examination conducted (internally) at the time of submission

Suggestive List of experiments:

1. To Study different types of Oracle Data types
2. To Study different types of DDL commands.
3. To study different types of DML commands.
4. To study different integrity constraints
5. To study different types SQl functions
6. To study subqueries.
7. To study views.
8. To study different types of joins
9. To study cursor and procedure in PL/SQL
10. To study trigger in PL/SQL

Practical Examination:
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

IT 257: Lab-Computer Workshop

Teaching Scheme		**Evaluation Scheme**	
Practical	4 rs/Week	Term Work:50	50 Marks
Credits	2	Practical/Viva-	--

Course objectives:

1. To introduce common hardware and software standards
2. To acquire the knowledge of working principles of the total system i.e. C.P.U., peripherals, interfaces and system software
3. Gain a understanding of the protocols and communication techniques used by networks
4. To learn about Network hardware like Media Types (cables, Wireless), Categories of UTP, Connectors, Network interface Card
5. Learn connecting hosts, Peer to Peer Networks, Client/Server Model, Workstation client Software

Expected Outcomes:

1. By the end of this course students should be able to make intelligent decision about the appropriate design, purchase, integration and use of devices.
2. Students get familiar with Networking Devices (Layer 1, Layer 2)

The term work shall consist of following practicals /assignments

1. Drawing the motherboard layout of Pentium IV and studying the chipset through data books or Internet
2. CMOS setup of Pentium.
3. Hard Disk Partitioning.
4. Study of HDD: Identify various components of HDD and write their functions.
5. Assignment on different types of cards such as graphics card, LAN card, multimedia cards etc.
6. Installation of Scanner, Printers and Modems.
7. Configuration of Client and Server PC, Laptop and Network components
8. Study of Diagnostic Software's. (Any one)
9. Fault findings: (a) Problems related to monitor (b) Problems related to CPU.
10. Assembling of PC and Installation of Operating System.
11. Study of LAN, its components and topologies.
12. Familiarization with Transmission Media.
13. Introduction to Network Architecture (Client/Server, Peer-to-Peer and Hybrid).
14. Preparing straight through and crossover cables.
15. Study of LAN, its components and topologies.
16. Making Point-to-Point connectivity.
17. Configuring Network.
18. Sharing of resources between two connected nodes.

TERM Work:

The term work consists of at least 16 experiments/ assignments based Suggestive List of experiments.

Assessment of term work should be done based on the points mentioned below:

- Continuous lab assessment
- Actually performing practices in the laboratory