MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COMPUTER GRAPHICS
15241201

COURSE OBJECTIVES

- To provide an introduction to the theory and practice of computer graphics.
- To give a good exposure related to Computer Graphics algorithms and to design various graphics primitives.
- To enhance the proficiency in programming skills related to animation and graphics object Design

Unit-I

Introduction to Computer Graphics: Interactive Computer Graphics, Application of Computer Graphics, Random and Raster Scan Displays, Storage Tube Graphics Display, Calligraphic Refresh Graphics Display, Flat Panel Display, Refreshing, Flickering, Interlacing, Resolution, Bit Depth, Aspect Ratio etc.

Unit-II

Scan Conversion Technique: Image representation, Line drawing: DDA, Bresenham's Algorithm. Circle Drawing: General Method, Mid-Point, DDA, Bresenham's Circle Generation Algorithm, And Ellipse Generation Algorithm, Curves: Parametric Function, Bezier Method, B-Spline Method.

Unit-III

2D & 3D Transformations: Translation, Rotation, Scaling, Reflection, Shearing, Inverse Transformation, Composite Transformation, World Coordinate System, Viewing Transformation, Representation of 3D object on Screen, Parallel and Perspective Projections.

Unit-IV

Clipping: Point clipping, Line Clipping, Simple Visibility Line Clipping Algorithm, Cohen Sutherland Line Clipping Algorithm etc., Polygon Clipping, Convex and Concave Polygon,

Sutherland Hodgeman Polygon Clipping Algorithm etc., Area Filling, HiddenSurface Elimination: Z- Buffer algorithm and Painter's Algorithm.

Unit-V

Basic Illumination Models: Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, and Color Models like RGB, YIQ, CMY, HSV

Image Manipulation and Storage: Introduction to Digital Image Processing (DIP), Digital Image Fundamentals, Types of images, Image representation, Image digitization, Histogram

RECOMMENDED BOOKS

- Computer Graphics, Donald Hearn and M.P. Becker, PHI Publication.
- Computer Graphics principle and Practice, FoleyVandam, Feiner, Hughes.
- Principles of Computers Graphics, Rogers, TMH.
- Computer Graphics, Sinha and Udai, TMH.
- Digital Image Processing, Gonzalez.

COURSE OUTCOMES

After completion of the course students will be able to:

CO1. Explain interactive Computer Graphics, various display devices and explore applications of computer graphics.

CO2. Illustrate various line generations, circle generation, curve generation and shape Generation algorithms.

CO3. Apply various 2-Dimensional and 3-Dimensional transformations and projections on Images.

CO4. Classify methods of image clipping and various algorithms for Line and Polygon clipping.

CO5. Choose appropriate filling algorithms, Hidden Surface Elimination algorithm and apply on various images.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2												
CO2			2		1								1	
CO3					2				2			2	2	
CO4					1								1	
CO5					2							1	3	2

1 - Slightly; 2 - Moderately; 3 – Substantially

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COMPUTER GRAPHICS
15241201

List of Experiments

1. Installation and Introduction to OpenGL basics, graphic functions, commands for compiling and executing an OpenGL Program.
2. Write an OpenGL Program to create an output window, to plot a point with given coordinates and other basic demonstrations.
3. Write an OpenGL Program to implement DDA Line Drawing Algorithm.
4. Write an OpenGL Program to implement Bresenham Line Algorithm.
5. Write an OpenGL Program to implement Mid-Point Circle Algorithm.
6. Write an OpenGL Program to implement following 2D transformations:
   i. Translation of a point, line and polygon.
   ii. Scaling of a line and polygon.
   iii. Rotation of a line and polygon around origin.
7. Write an OpenGL Program to implement:
   i. Flood Filling Algorithm using polygon.
   ii. Boundary Filling Algorithm using polygon.

COURSE OUTCOMES

After completion of the course students will be able to:

CO1. Develop the ability to implement and manipulate algorithms for drawing geometric shapes, transformations, and color models.

CO2. Implement and apply 2D and 3D transformations (translation, rotation, scaling, reflection, etc.) on graphical objects.

CO3. Develop the ability to design and implement a complete graphical application with user interaction and dynamic graphics.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1												
CO2			2		1								1	
CO3					2						1	2	2	1

1 - Slightly; 2 - Moderately; 3 – Substantially

Department of Computer Science & Engineering

COMPUTER GRAPHICS 150224(DC)(OLD)

COURSE OBJECTIVES

- To provide an introduction to the theory and practice of computer graphics.
- To give a good exposure related to Computer Graphics algorithms and to design variousgraphics primitives.
- To enhance the proficiency in programming skills related to animation and graphicsobject Design

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Unit-I

Introduction to Computer Graphics: Interactive Computer Graphics, Application of Computer Graphics, Random and Raster Scan Displays, Storage Tube Graphics Display, Calligraphic Refresh Graphics Display, Flat Panel Display, Refreshing, Flickering, Interlacing, Resolution, Bit Depth, Aspect Ratio etc.

Unit-II

Scan Conversion Technique: Image representation, Line drawing: DDA, Bresenham's Algorithm. Circle Drawing: General Method, Mid-Point, DDA, Bresenham's Circle Generation Algorithm, And Ellipse Generation Algorithm, Curves: Parametric Function, Bezier Method, B-Spline Method.

Unit-III

2D & 3D Transformations: Translation, Rotation, Scaling, Reflection, Shearing, Inverse Transformation, Composite Transformation, World Coordinate System, Viewing Transformation, Representation of 3D object on Screen, Parallel and Perspective Projections.

Unit-IV

Clipping: Point clipping, Line Clipping, Simple Visibility Line Clipping Algorithm, Cohen Sutherland Line Clipping Algorithm etc., Polygon Clipping, Convex and Concave Polygon, Sutherland Hodgeman Polygon Clipping Algorithm etc., Area Filling, Hidden Surface Elimination: Z- Buffer algorithm and Painter's Algorithm.

Unit-V

Basic Illumination Models: Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, and Color Models like RGB, YIQ, CMY, HSV etc., and Introduction to Digital Image Processing (DIP), Fundamental Steps and Components of DIP.

RECOMMENDED BOOKS

- Computer Graphics, Donald Hearn and M.P. Becker, PHI Publication.
- Computer Graphics principle and Practice, FoleyVandam, Feiner, Hughes.
- Principles of Computers Graphics, Rogers, TMH.
- Computer Graphics, Sinha and Udai, TMH.
- Digital Image Processing, Gonzalez.

COURSE OUTCOMES

After completion of the course students will be able to:

CO1. Explain interactive Computer Graphics, various display devices and explore applicationsof computer graphics.
CO2. Illustrate various line generations, circle generation, curve generation and shapeGeneration algorithms.
CO3. Apply various 2-Dimensional and 3-Dimensional transformations and projections onImages.
CO4. Classify methods of image clipping and various algorithms for Line and Polygon clipping.
CO5. Choose appropriate filling algorithms, Hidden Surface Elimination algorithm and applyon various images.
CO6. Discuss various color models, shading methods, animation and Digital Image Processing.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

OBJECT ORIENTED PROGRAMMING & METHODOLOGY
15241202

COURSE OBJECTIVES

- To study about the concept of object oriented programming.
- To create C++ programs that leverage the object oriented features of the C++ Language.
- To apply object oriented or non-object oriented techniques t o solve bigger computing problems.

Unit-I

Introduction to C++ and Object Oriented Concepts: Basics of C++, Tokens, I/O Statements, Structure of Program, Operators and Expressions, Flow of Control, Arrays, Structures, Functions and its type, Function Prototyping, Pointers, Pointer Variables, Pointers and Arrays, Array of Pointers, Pointers and Structures, Dynamic Memory Allocation. Programming Techniques: Unstructured & Structured Programming, Object Oriented Paradigm, Features of Oops, Comparison with Procedural Oriented Programming & Object Oriented Programming, Abstract Data Types, Reference Variable, Scope Resolution Operator.

Unit-II

Classes & Objects: Specification of Class, Visibility Modes: Private, Public, Protected, Defining Member Functions, Creating of Objects, Characteristics of Object, Static Data Member, Static Member Function, Array of Objects, Object as Arguments, Inline Function, Default Arguments, Friend Function, Recursion. **Constructors and Destructors:** Introduction, Types of Constructors- Default Constructor, User Defined Constructor, Parameterized Constructor, Copy Constructor, Constructor with Default Arguments, Rules of Constructor Definition and Usage, Destructs

Unit-III

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading: Binary Operators, Arithmetic Assignment Operators, Unary Operators, Rules for Operator Overloading, Pitfalls of Operator Overloading, Data Conversion, Type Casting.

Unit-IV

Inheritance: Introduction to Code Reuse, Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath. Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Nesting of Classes, Overriding Member Function. Containership: Classes with in Classes, Function Overriding.

Unit-V

Pointer & File Concept: Pointers Overview, Pointers to Objects, This Pointer, Pointers to Derived Classes, Virtual Functions & Pure Virtual Function, Association, Type of Association, Aggregation, File Concepts, Study of Various Files and Streams, Opening and Closing of FilesFunctions Get(), Getline(), Put(), Opening The Files Using Function Open(), File Manipulator FunctionInterfaces), Reactive Programming in OOP, Microservices and OOP, Domain-Driven Design (DDD), AI and OOP Integration, AI- Driven Code Generation and OOP, Distributed Object-Oriented Systems

RECOMMENDED BOOKS

- C++ How to Program, H M Deitel and P J Deitel, Prentice Hall..
- Programming with C++, D Ravichandran, T.M.H.
- Computing Concepts with C++ Essentials, Horstmann, John Wiley.
- The Complete Reference in C++, Herbert Schildt, TMH.
- Object-Oriented Programming in C++, E Balagurusam
- Fundamentals of Programming C++, Richard L. Halterman.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. Describe various fundamental of object oriented design for programming practices.

CO2. Apply fundamental Object-Oriented Programming principles such as encapsulation, inheritance, and polymorphism in real problem.

CO3. Develop robust and scalable software systems and applications.

CO4. Create modular, maintainable, and extensible code that adheres to industry best practices.

CO5. Evaluate Object-Oriented solutions and make informed design decisions

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3												
CO2			2				3						1	
CO3					2				2			2	2	
CO4					1								1	
CO5					2							1	3	1

1 - Slightly; 2 - Moderately; 3 - Substantiall

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

OBJECT ORIENTED PROGRAMMING & METHODOLOGY
15241207

List of Experiments

1. Write a program to swap two integers without using third variable. The swapping must be done in a function of a particular class.

2. Write a program that uses a class where the member functions are defined outside a class.

3. Design a class to represent a bank account. Which includes account number, name of the depositor, type of the account, balance amount in the account. Define Methods, to assign initial values, to Deposit an amount, to Withdraw amount after checking balance, to display name and balance.

4. Write a program to find the greater of two given numbers in two different classes using friend function.

5. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.

6. Create two classes: Polar and Cartesian, to represent Polar and Cartesian coordinates of a point. Demonstrate how to convert Polar coordinates to Cartesian coordinates by writing the conversion code in source class.

7. Write a program to demonstrate anomaly caused in Multi-path Inheritance. Also, write a program to overcome the anomaly.

8. Create an abstract class Shape which has a field P1=3.14 as final and it has an abstract method Volume. Make two sub-classes 'Cone' and 'Sphere' from this class and they should print their volume

9. 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

10. Write a program to demonstrate working of various file handling operations in C++

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. Demonstrate the use of various OOPs concepts with the help of programs.

CO2. Formulate solutions to problems demonstrating usage of control structures, modularity, I/O and other standard language constructs.

CO3. Enumerate Implement appropriate object orient programming concepts for solving real world problems.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1		1											1
CO2		1	2				1						1	
CO3		1			1									2

1 - Slightly; 2 - Moderately; 3 – Substantially

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

OBJECT ORIENTED PROGRAMMING & METHODOLOGY
3150222(OLD)

COURSE OBJECTIVES

- To study about the concept of object oriented programming.
- To create C++ programs that leverage the object oriented features of the C++ Language.
- To apply object oriented or non-object oriented techniques t o solve bigger computing problems.

Unit-I

Introduction to C++ and Object Oriented Concepts: Basics of C++, Tokens, I/O Statements, Structure of Program, Operators and Expressions, Flow of Control, Arrays, Structures, Functions and its type, Function Prototyping, Pointers, Pointer Variables, Pointers and Arrays, Array of Pointers, Pointers and Structures, Dynamic Memory Allocation. Programming Techniques: Unstructured & Structured Programming, Object Oriented Paradigm, Features of Oops, Comparison with Procedural Oriented Programming & Object Oriented Programming, Abstract Data Types, Reference Variable, Scope Resolution Operator.

Unit-II

Classes & Objects: Specification of Class, Visibility Modes: Private, Public, Protected, Defining Member Functions, Creating of Objects, Characteristics of Object, Static Data Member, Static Member Function, Array of Objects, Object as Arguments, Inline Function, Default Arguments, Friend Function, Recursion. **Constructors and Destructors:** Introduction, Types of Constructors- Default Constructor, User Defined Constructor, Parameterized Constructor, Copy Constructor, Constructor with Default Arguments, Rules of Constructor Definition and Usage, Destructs

Unit-III

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading: Binary Operators, Arithmetic Assignment Operators, Unary Operators, Rules for Operator Overloading, Pitfalls of Operator Overloading, Data Conversion, Type Casting.

Unit-IV

Inheritance: Introduction to Code Reuse, Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath. Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Nesting of Classes, Overriding Member Function. Containership: Classes with in Classes, Function Overriding.

Unit-V

Pointer & File Concept: Pointers Overview, Pointers to Objects, This Pointer, Pointers to Derived Classes, Virtual Functions & Pure Virtual Function, Association, Type of Association, Aggregation, File Concepts, Study of Various Files and Streams, Opening and Closing of FilesFunctions Get(), Getline(), Put(), Opening The Files Using Function Open(), File Manipulator FunctionInterfaces).

RECOMMENDED BOOKS

- C++ How to Program, H M Deitel and P J Deitel, Prentice Hall..
- Programming with C++, D Ravichandran, T.M.H.
- Computing Concepts with C++ Essentials, Horstmann, John Wiley.
- The Complete Reference in C++, Herbert Schildt, TMH.
- Object-Oriented Programming in C++, E Balagurusam
- Fundamentals of Programming C++, Richard L. Halterman.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. Tell the concepts of classes & objects and their significance in real world.

CO2. Explain the benefits of object oriented design..

CO3. Build C++ classes using appropriate encapsulation and design principles.

CO4. Analyze the utilization of inheritance and polymorphism in the solution of problems.

CO5. Choose appropriate object orient programming concepts for solving real world problems.

CO6. Develop solutions to problems demonstrating usage of control structures, modularity, I/O and other standard language constructs.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COMPUTER SYSTEM AND ORGANIZATION
15241203

COURSE OBJECTIVES

- To provide the fundamental knowledge of a computer system and its processing units.
- To provide the details of input & output operations, memory management and performancemeasurement of the computer system.
- To understand how computer represents and manipulate data.

Unit - I

Introduction: Von-Neumann Model, Various Subsystems, CPU, Memory, I/O, System Bus, CPU and Memory Registers, Program Counter, Accumulator, Register Transfer and Micro Operations: Register Transfer Language, Register Transfer, Tree-State Bus Buffers, Bus and Memory Transfers, Arithmetic Micro-Operation, Logic Micro-Operation, Shift Micro-Operation Register Transfer Micro Operations, Arithmetic Micro-Operations, Logic Micro-Operations and Shift Micro-Operations.

Unit- II

Computer Arithmetic: Addition and Subtraction with Signed-Magnitude, Multiplication Algorithm, Division Algorithm, Division Algorithms, Floating-Point Arithmetic Operations.

Central Processing Unit (CPU): General Purpose Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).Hardwired and Micro programmed Control.

Unit -III

Microprocessors: Introduction of 8085 Microprocessor: Architecture, Instruction Set, Addressing Modes, Interrupts and Basic Assembly Language Programming, Introduction to Pipelining & Multiprocessors.

Unit -IV

Input-Output Organization: Peripheral Devices, I/O Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA (DMA Controller, DMA Transfer), Input-Output Processor (IOP), Data Transfer- Serial/Parallel, Simplex/ Half Duplex/ Full Duplex.

Unit-V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory- Organization and Mappings, Memory Management Hardware, Parallel & Distributed systems, Storage Systems and file system: RAID, Distributed File System, Storage Class Memory.

RECOMMENDED BOOKS

- Computer System Architecture, Morris Mano, PHI.
- Microprocessor Architecture, Programming and Applications with the 8085, Gaonkar,
- Computer Organization, Carl Hamacher, THM.
- Computer Architecture and Organization, J P Hayes, Mc-Graw Hills, New Delhi.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. Understand the Fundamental Components of Computer Systems.
CO2. Perform and Analyze Computer Arithmetic Operations
CO3. Analyze Instruction Set and Addressing Modes of 8085
CO4. Understand the working of IOPs and various communication modes to optimize data exchange in computing systems.
CO5. Explain and Utilize Memory Management Hardware

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3			3							3	3	
CO2	3	3					3					2	3	3
CO3	3	2	2		3				2			3	3	3
CO4	3	3		3	2							3	3	3
CO5	3	3		3	3							2	3	3

1 - Slightly; 2 - Moderately; 3 - Substantially

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COMPUTER SYSTEM ORGANIZATION(OLD)

COURSE OBJECTIVES

- To provide the fundamental knowledge of a computer system and its processing units.
- To provide the details of input & output operations, memory management and performancemeasurement of the computer system.
- To understand how computer represents and manipulate data.

Unit - I

Introduction: Von-Neumann Model, Various Subsystems, CPU, Memory, I/O, System Bus, CPU and Memory Registers, Program Counter, Accumulator, Register Transfer and Micro Operations: Register Transfer Language, Register Transfer, Tree-State Bus Buffers, Bus and Memory Transfers, Arithmetic Micro-Operation, Logic Micro-Operation, Shift Micro-Operation Register Transfer Micro Operations, Arithmetic Micro-Operations, Logic Micro-Operations and Shift Micro-Operations.

Unit- II

Computer Arithmetic: Addition and Subtraction with Signed-Magnitude, Multiplication Algorithm, Division Algorithm, Division Algorithms, Floating-Point Arithmetic Operations.

Central Processing Unit (CPU): General Purpose Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).Hardwired and Micro programmed Control.

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Microprocessors: Introduction of 8085 Microprocessor: Architecture, Instruction Set, Addressing Modes, Interrupts and Basic Assembly Language Programming, Introduction to Pipelining & Multiprocessors.

Unit -IV

Input-Output Organization: Peripheral Devices, I/O Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA (DMA Controller, DMA Transfer),

Input-Output Processor (IOP), Data Transfer- Serial/Parallel, Simplex/ Half Duplex/ Full Duplex.

Unit-V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory- Organization and Mappings, Memory Management Hardware.

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- Computer System Architecture, Morris Mano, PHI.
- Microprocessor Architecture, Programming and Applications with the 8085, Gaonkar,
- Computer Organization, Carl Hamacher, THM.
- Computer Architecture and Organization, J P Hayes, Mc-Graw Hills, New Delhi.

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After completion of the course students would be able to:

CO1. Understand the Fundamental Components of Computer Systems.
CO2. Perform and Analyze Computer Arithmetic Operations
CO3. Analyze Instruction Set and Addressing Modes of 8085
CO4. Understand the working of IOPs and various communication modes to optimize data exchange in computing systems.
CO5. Explain and Utilize Memory Management Hardware

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

OPERATING SYSTEMS
15241204

COURSE OBJECTIVES

- Provide basic knowledge of computer operating system structures and functioning.
- Compare several different approaches to memory management, file management and process management
- Understand various problems related to concurrent operations and their solutions.

Unit- I

Basics of operating systems: Generations, Types, Structure, Services, System Calls, System Boot, System Programs, Protection and Security.
Process management: Process Concepts, Process States, Process Control Block, Scheduling-Criteria, Scheduling Algorithms and their Evaluation, Threads, Threading Issues.

Unit-II

Process synchronization: Background, Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors.
Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock.

Unit-III

Memory management: Main Memory, Swapping, Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

Unit-IV

Storage management: Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, RAID Structure.

Unit-V

File system interface: File Concept, Access Methods, Directory Structure, File System Structure, Allocation Methods, and Free-Space Management.
System Protection: Goals, Principles, Domain of Protection, Access Matrix, Access Control.
Emerging topics: Real-Time Operating systems (RTOS), Sustainable Software Lifecycle Management in Software engineering, Ethical Software Designed Development

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RECOMMENDED BOOKS

- Operating System Concepts, Silberschatz, Ninth Edition, Willey Publication.
- Operating Systems, Internals and Design Principles, Stallings, Seventh Edition, Pearson Publication.
- OPERATING SYSTEMS, Dr. Sukomal Pal, AICTE
- Modern Operating Systems, Tanenbaum, Fourth Edition. Pearson Publication.

COURSE OUTCOMES

After the successful completion of this course, the student will be able to:

CO1. **Outline** the basic concept of operating systems
CO2. **Analyze** the working of operating system
CO3. **Examine** the working of various scheduling/allocation approaches
CO4. **Measure** the performance of various scheduling/allocation approaches
CO5. **Develop** the Solution of various operating system problems/issues

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	2	1	1	1	1	3	3	3
CO2	3	3	3	3	3	1	1	1	1	1	1	3	3	3
CO3	3	3	3	3	3	2	1	1	1	1	1	3	3	3
CO4	3	3	2	3	2	1	1	1	1	1	1	3	3	3
CO5	3	3	3	3	2	1	1	1	1	1	1	3	3	3

1 - Slightly; 2 - Moderately; 3 – Substantially

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BASIC ELECTRICAL & ELECTRONICS ENGINEERING
15241205

Course Objectives:

- To impart basic knowledge of the DC and AC circuits and their applications.
- To familiarize the students with the basic knowledge of magnetic circuits, transformer, rotating electrical machine and its terminology.
- To make familiarize the students about the working of, various electronic circuits and its importance.

Unit I - D.C. Circuits Analysis: Voltage and Current Sources: Dependent and independent source, Source conversion, Kirchhoff's Law, Mesh and Nodal analysis. Network theorems: Superposition theorem, Thevenin's theorem & Norton's theorem and their applications.

Unit II –Single-phase AC Circuits: Generation of sinusoidal AC voltage, definitions: Average value, R.M.S. value, Form factor and Peak factor of AC quantity, Concept of Phasor, analysis of R-L, R-C, R-L-C Series and Parallel circuit, Power and importance of Power factor.

Unit III- Magnetic Circuits & Resonance: Magnetic Circuits: Concept of MMF, flux and magnetic reluctance, Self and mutual inductances, Dot convention, coefficient of coupling and coupled circuits. Resonance: Series and Parallel resonance, Bandwidth, Q-factor and selectivity.

Unit IV- Single-phase Transformer & Rotating Electrical Machines: Single phase transformer, Basic concepts, construction and working principal, Ideal Transformer and its phasor diagram at No Load, Voltage, current and impedance transformation, Equivalent circuits and its Phasor diagram, voltage regulation, losses and efficiency, testing of transformers, Construction & working principle of DC and AC machine.

Unit V - Digital Electronics, Devices & Circuits: Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, Demorgan's theorem, Logic gates- symbolic representation and their truth table, Introduction to semiconductors, Diodes, V-I characteristic, Bipolar junction transistors and their working, Introduction to CB, CE & CC transistor configurations.

Recommended Books:

1. Basic Electrical and Electronics Engineering, D.P. Kothari &I.J. Nagrath-Tata McGraw Hill
2. Basic Electrical and Electronics Engineering, V N Mittle& Arvind Mittal -Tata McGraw Hill
3. Basic Electrical and Electronics Engineering, S. K Bhattacharya -Pearson
4. Electrical Machinery- A.E. Fitzgerald, C. Kingsley and Umans - TMH
5. Principles of Electrical Engineering- Vincdent Del Toro- Prentice Hall.
6. Basic Electrical Engineering -A,E. Fitzgerald, Higginbotham and Grabel -TMH
7. Integrated Electronics- Millmann& Halkias

Course Outcomes

At the end of the course, the student will be able to:

CO 1. **Solve** dc & ac circuits by applying fundamental laws & theorems
CO 2. **Analyze** magnetic circuits and resonance characteristics of ac electric circuits
CO 3. **Describe** the working principle, construction, applications of single phase transformer & rotating electrical machines
CO 4. **Select** the logic gates for various applications in digital electronic circuits.
CO 5. **Explain** the characteristics and parameters of Diode and Transistor.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	2	1	1	1	1	1	3	2	-
CO2	3	3	3	3	2	2	1	1	1	1	1	3	2	-
CO3	3	3	3	3	2	2	1	1	1	1	1	3	2	-
CO4	3	3	2	3	3	2	1	1	1	1	1	3	2	-
CO5	3	3	3	3	2	2	1	1	1	1	1	3	2	

1 - Slightly; 2 - Moderately; 3 – Substantially

BASIC ELECTRICAL & ELECTRONICS ENGINEERING
15241205

LIST OF EXPERIMENT

1. To verify Kirchhoff's Current Law & Kirchhoff's Voltage Law.
2. To verify Superposition Theorem
3. To determine resistance & inductance of a choke coil.
4. To determine active & reactive power in a single phase A.C circuit.
5. To determine voltage ratio & current ratio of a single phase transformer.
6. To determine the polarity of a single phase transformer.
7. To perform open circuit & short circuit test on a single phase transformer.
8. To study multimeter & measure various electrical quantities
9. To study of constructional details of DC machine.
10. To determine the V-I characteristics of diode in forward bias & reverse bias condition.

Course Outcomes:

After the completion of the lab, the student will be able to –

CO1 **Demonstrate** the ability to operate lab equipment and instruments relevant to the electrical engineering field

CO2 **Collect** experimental data accurately and effectively

CO3 **Integrate** theoretical knowledge from coursework into practical applications and experiments

CO4 **Communicate** experimental results effectively through oral presentations and written documentation

CO5 **Demonstrate** responsibility and professionalism in the completion of lab tasks and assignments

CO6 **Show** willingness to learn new techniques, tools, or methods to enhance practical engineering skills

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	2	2	1	3	3	-
CO2	3	3	3	3	2	2	2	3	2	2	2	3	3	-
CO3	3	3	3	3	3	2	1	2	3	2	3	3	3	2
CO4	2	2	2	2	2	1	2	2	2	3	3	3	3	-
CO5	1	1	1	1	1	1	2	3	2	2	2	2	2	2

CO6	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**2**	**3**		

1 - Slightly; 2 - Moderately; 3 – Substantially