DC	13251101	Electrical Engineering Material	3-0-0

Course Objectives:

- The objective is to familiarize the students with different types of Engineering materials and their use in the field of Electrical Engineering.

Unit-I. Conducting Materials: The conductivity of metals and alloys, Generals properties, Classification of conducting materials, Low resistivity and high resistivity materials, their properties and applications, Electrical and mechanical properties and applications of Cu, Al, Steel, ACSR conductor, AAAC conductor, Tungsten, Molybdenum, Platinum, mercury, lead, manganin, metals and Alloys for fuses, superconductivity and its applications.

Unit-II. Semiconductor Materials: Classification of materials based on atomic structure, conductors, insulators and semiconductors, Electron energy and energy band theory, Semiconductor materials, Intrinsic semiconductors, Extrinsic semiconductor, N type materials, P type materials, minority and majority carriers., Merits of semiconductor materials, Factors affecting semiconductors, application of semiconductor materials, Hall Effect.

Unit-III. Magnetic Materials: Different terms associated with magnetic materials. Classification of magnetic materials: Diamagnetic, Paramagnetic and ferromagnetic materials. Curie point, Magnetostriction, electromagnet and its uses, Magnetization curve, Hysteresis and eddy current loss, Soft and hard magnetic materials, their properties and applications, its advantage and disadvantages, requirements of magnetic materials for use in Electrical machines, Magnetic anisotropy, Spontaneous magnetization.

Unit-IV. Dielectric& Insulating Materials: Behavior of dielectrics in static and alternating fields, polarization, Dielectric constant of mono atomic gases, ionic polarization, Dipolar polarization, internal fields in solids and liquids, permittivity, dielectric losses, significance of the loss tangent dipolar relaxation, Ferro electricity, piezoelectricity. General electrical, mechanical, thermal and chemical properties of insulating materials, classification of insulating materials on the basis of temperature rise. Gaseous insulating materials properties and application of nitrogen, liquid insulating materials, their main features

Unit-V. Nanomaterials &Energy Efficient Materials: Introduction to nanomaterials, general properties of nanomaterials, applications of nanomaterials in science, engineering and technology. Energy Efficient Materials: Green Materials, Biomaterials, Natural and Synthetic Polymers, Photovoltaic (PV) thin films for solar cells.

Recommended Books:

1. Science of Engineering Materials By C.M.Srivastava&C.Srinivasan,New Age International Publisher,2010.
2. A Text Book of Electrical Engineering Materials By P.L. Kapoor, Khanna Publication,2016
3. Electrical Engineering Materials By A.J. Dekker, PHI,2015
4. An Introduction to Electrical Engineering Materials By C.L. Indulkar, S. Thiravengadam, S. Chand & Co,2006

Course Outcomes

After completing this course, the student will be able to:

CO1. **Explain** the electrical, thermal, and mechanical properties of conducting materials and their applications in electrical engineering.

CO2. **Describe** the behavior of semiconductor materials based and assess their application in electronic devices.

CO3. **Classify** magnetic materials based on their properties and relate their suitability to specific electrical applications**.**

CO4. **Analyze** the dielectric behavior and properties of insulating materials under different electrical conditions**.**

CO5. **Identify** the properties and applications of nanomaterials and energy-efficient materials used in modern engineering.

Course Articulation Matrix

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

1 - Slightly; 2 - Moderately; 3 – Substantially

ESC	13251102	Computer Programming	2-0-2

Course Objectives:

- To introduce C++ programming fundamentals including data types, control structures, and functions.
- To apply object-oriented concepts like classes, objects, and memory management.
- To explore modern tools such as Git, GitHub, and AI-assisted coding techniques.

Unit-I. Introduction to Programming, Types of Computer Programming Languages, Program Execution and Translation Process, Introduction to C++ Programming, Data Types, Constants, Keywords, Variables, Input/Output, Operators and Expressions, Precedence of Operators.

Unit-II. Control Statements and Decision Making: if, if-else, Nested if, switch; Looping Constructs: while, do...while, for, Nested Loops, break, continue; Arrays: One-dimensional Arrays, Multidimensional Arrays, Passing Arrays to Functions.

Unit-III. Function Basics, Function Prototypes, Passing Parameters by Value and by Reference, Default Arguments, Recursion, Strings, Operations on Strings, Pointers and Addresses, Reference Variables, Pointer to Pointer, Pointer to Array, Array of Pointers, Pointer to Strings

Unit- IV. Dynamic Memory Allocation, Structures, Unions, File Concepts, File Types and Streams, File Operations. Object-Oriented Paradigm, Features of OOP, Procedural vs Object-Oriented Programming, Classes and Objects, Visibility Modes, Member Functions, Constructors and Destructors.

Unit-V. Basics of Git and GitHub, functional programming concepts (lambda, map, filter), introduction to unit testing and debugging, overview of AI-assisted coding tools like GitHub, Copilot.

Recommended Books:

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

Course Outcomes:

After completing this, the students will be able to:

CO1. **Explain** the fundamental concepts of C++ programming including data types, operators, and program execution using flowcharts and algorithms.

CO2. **Write** programs using control statements & decision making statements such as go to, if-else, switch, break, and continue

CO3. Analyze the use of functions, strings, pointers, and memory references to implement modular and efficient code.

CO4. Develop object-oriented solutions using classes, objects, constructors, destructors, structures, unions, dynamic memory allocation, and file operations.

CO5. Use of modern programming tools and practices including version control (Git), functional programming concepts, unit testing, debugging, and AI-assisted coding tools.

Course Articulation Matrix

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

1 - Slightly; 2 - Moderately; 3 – Substantially

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ESC	13251103	Basic Civil Engineering & Mechanics	3-0-0

Course Objectives:

- To develop a thorough understanding of different building materials; measure distance, direction and elevation using different method; Force systems, plane truss, centre of gravity, moment of inertia and shear force & bending moment diagram.

Unit-I Building Materials: Stones, bricks, cement, timber - types, properties, test & uses, Introduction of concrete properties &Laboratory tests on concrete.

Unit-II Surveying & Positioning: Introduction to surveying, Measurement of distances-conventional and EDM methods, Measurement of directions by different methods, Measurement of elevations by different methods.

Unit-III Forces and Equilibrium: Concurrent and non-concurrent co-planner forces, free body Diagram, Application of Equilibrium Concepts: Analysis of plane Trusses, method of joints, method of Sections.

Unit–IV Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment of Inertia of Composite section, Radius of Gyration.

Unit–V Shear Force and Bending Moment: Support reactions, shear force and bending moment diagram for cantilever & simply supported beam with concentrated, distributed load and Couple.

Recommended Books:

1. Surveying,Vol.–1,Punmia B.C., Laxmi Publications,17$^{t\ h}$edition,2016
2. Building Material, B.C. Punmia, Laxmi Publications, 2016
3. A text book of Engineering Mechanics, D.S. Kumar, Katsons Publications,2013
4. Basic Civil Engineering, S. Ramamrutam&R.Narayan,DhanpatRaiPub.,3rdedition,2013

Courses Outcomes

Upon completion of the course, a student will be able to

CO1: **Explain** the properties, test and use of different building materials.
CO2: **Determine** the distance, direction and elevation using different methods.
CO3: **Analyze** the different force systems and plane truss.
CO4: **Determine** the centroid and moment of inertia.
CO5: **Draw** shear force and bending moment diagram

Course Articulation Matrix

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

1 - Slightly; 2 - Moderately; 3 – Substantially

ESC	13251104	Basic Mechanical Engineering	3-0-0

Course Objectives:

- To develop the fundamentals of Engineering materials, measurement and reciprocating machines.
- To understand the Thermodynamic laws, steam generator and reciprocating machines for solving engineering problems.

Unit-I: Materials: Classification of engineering material, composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; Stress-Strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

Unit-II: Measurement: Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainty analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lathe drilling, milling and shaping machines.

Unit-III Thermodynamics: Zeroth, First, second and third law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, Refrigeration, vapour compression cycles, coefficient of performance (COP).

Unit-IV Reciprocating Machines: Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol and diesel IC engines.

Unit-V Advances in Mechanical Engineering: Heating, Ventilation, and Air Conditioning (HVAC**)** software. Artificial Intelligence (AI)-Driven Combustion Control, Coordinate Measuring Machine (CMM), Electric Vehicle Technology.

Recommended Books:

1. Narula; Material Science; TMH
2. Agrawal B & CM; Basic Mechanical Engineering; TMH
3. Nag PK, Tripathi et al; Basic Mechanical Engineering; TMH
4. Rajput; Basic Mechanical Engineering;
5. Sawhney GS; Fundamentals of Mechanical Engibneering; PHI
6. Nakra and Chaudhary; Instrumentation and Measurement; TMH
7. Nag PK; Engineering Thermodynamics; TMH

Course Outcomes:

After successful completion of this course students will be able to:

CO 1. Select appropriate material for specific engineering applications

CO 2. Explain the basic operation of lathe, drilling, milling, and shaping machines and principles for measurement of physical quantities such as temperature, pressure, velocity, flow, strain, force, and torque

CO 3. Apply laws of thermodynamics to steam processes, boilers, and refrigeration

CO 4. Describe the working of reciprocating machine i.e. steam engines and internal combustion engines.

CO 5. Apply modern tools such as HVAC simulation software, AI-driven combustion control systems, CM, and electric vehicle technologies.

Course Articulation Matrix

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

1-Slightly;2-Moderately;3–Substantially

ESC	13241105	Basic Electrical & Electronics Engineering	2-0-0

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 and 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 Transformer & Electrical Machines: Magnetic Circuits and Electromagnetism, Transformers: Construction, principle, types, losses & efficiency, OC & SC test. DC Machines: Motor and Generator working Principles, Characteristics, Introduction to Induction Motors and Synchronous Machines.

Unit IV Digital Electronics, Devices & Circuits: Number Systems, Logic Gates and Truth Tables, Diodes, Transistors (BJT), Multiplexers, Demultiplexers.

Unit V Emerging Trends and Applications: Introduction to Smart Grids, Smart Meters, and Renewable Systems. Types of earthing, Sensors and Basic IoT Applications, Tariff, Bureau of Indian Standards(BIS).

Recommended Books:

1. Basic Electrical and Electronics Engineering, D.P. Kothari and I.J. Nagrath, 2nd Edition, McGraw-Hill Education, 2020.
2. Basic Electrical and Electronics Engineering, S.K. Bhattacharya, 2nd Edition, Pearson Education, 2017.
3. Basic Electrical Engineering, V.N. Mittle and Arvind Mittal, 2nd Edition, McGraw-Hill Education, 2005.
4. Basic Electrical Engineering, A.E. Fitzgerald, David E. Higginbotham, and Arvin Grabel, 5th Edition, McGraw-Hill Education, 1981.
5. Principles of Electrical Engineering and Electronics, V.K. Mehta and Rohit Mehta, Revised Edition, S. Chand Publishing, 2019.

Course Outcomes (COs):

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

CO1. **Analyze** DC circuits by fundamental laws and network theorems.
CO2. **Analyze** single-phase series & parallel AC circuits for calculation of power, power factor, and resonance conditions.
CO3. **Explain** the working principles, construction, and operational characteristics of transformers, DC machines, and induction motors.
CO4. **Design** basic digital logic circuits using logic gates, flip-flops, and counters
CO5. **Discuss** the concepts of smart meter, smart grids, earthing, and IoT systems to emerging industrial applications in automation and renewable energy systems.

Course Articulation Matrix

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

1 - Slightly; 2 - Moderately; 3 – Substantially

MAC	13251110	Universal Human Values & Professional Ethics	2-0-0

Course Objectives:

The objective of the course is four fold: Sensitization of student towards self, family (relationship),society and nature, understanding (or developing clarity) of nature, society and larger systems, on the basis of human relationships and resolved individuals, strengthening of self-reflection and development of commitment and courage to act.

1. **Understanding Harmony in the Human Being**:Course Introduction - Need, Basic Guidelines, Content and Process for Value Education. Understanding human being as a co-existence of the sentient 'I' and the material 'Body', happiness and physical facility. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of 'I' with the Body
2. **Understanding Harmony in the Family and Society-** Harmony in Human-Human Relationship Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship. Understanding the meaning of Trust; Difference between intention and competence. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. Visualizing a universal harmonious order in society
3. **Understanding Harmony in the Nature and Existence - existence as Coexistence**: Understanding the harmony in the Nature. Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature. Understanding Existence as Co-existence of mutually interacting units in all pervasive space. Holistic perception of harmony at all levels of existence.
4. **Holistic Understanding of Harmony on Professional Ethics**: Natural acceptance of human values Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:Ability to utilize the professional competence for augmenting universal human order. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems. Ability to identify and develop appropriate technologies and management patterns for above production systems.Strategy for transition from the present state to Universal Human Order:At the level of individual: as socially and ecologically responsible engineers, technologists and managers. At the level of society: as mutually enriching institutions and organizations.
5. **Gender Sensitisation:** Introduction to Sex, Gender &Culture Introduction to Women Studies and Socialisation, including man-woman relationship, work distributionA brief review of Feminism, Patriarchy, Feminist Studies, Feminist Ideologies.. Women and Law Constitutional Provisions and Fundamental rights related to Women

Text Book

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010
2. JeevanVidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi

Course Outcomes

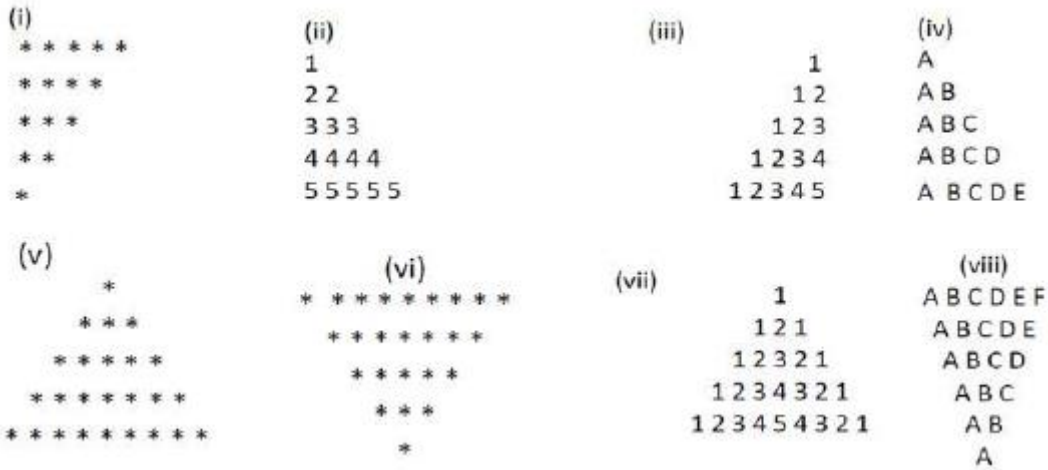
At the end of the course, the student will be able to:

CO 1. Explain the co-existence of 'I' and the body, and the harmony within the human being as the foundation for value education.
CO 2. Interpret the principles of harmony in relationships and society based on trust, respect, justice, and mutual fulfilment.
CO 3. Illustrate the interconnectedness and co-existence of nature and existence through the concept of harmony at all levels.
CO 4. Evaluate professional ethics by integrating human values, sustainability principles, and people- and eco-friendly practices.
CO 5. Analyze gender roles, feminist ideologies, and legal rights to promote gender sensitization and equality.

ESE	13251106	Computer Programming Lab	0-0-2

LIST OF EXPERIMENTS

1. Write a program to add two numbers and display its sum.
2. Write a Program to calculate and display the volume of a cylinder for height and radius parameters to be input from the user.
3. Write a program to realize the following expressions:
   a. v = u + at
   b. S = ut+1/2(at^2)
4. Write a program to take input of name, enrollment number and marks obtained by a student in 5 subjects of 100 marks each and display the name, enrollment number with percentage score secured.
5. Write a program to swap values of two variables with and without using the third variable.
6. Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.
7. Write a program to find the largest of three numbers using ternary operators.
8. Write a program to find the roots of quadratic equation.
9. Write a Program to Check Whether a Number is Prime or not.
10. Write a program to check whether the entered year is leap year or not. (Hint: a year is leap if it is divisible by 4 and divisible by 100 or 400.)
11. Write a program to print the sum of digits of a number using for loop.
12. Write a program to display the following pattern using for loops.



13. Write a program to Display Fibonacci Sequence.
14. Write a program to display different kind of pyramid patterns using for loops.
15. Write a program to add two matrices of the same order.
16. Write a program to show the working of predefine functions in string.
17. Write a program to illustrate concept of function and different type of functions.
18. Write a program to find factorial of a number using recursion.
19. Write a program to find sum of natural numbers using recursion.
20. Write a program to illustrate concept of structure and union in c programming.
21. Write a Program to calculate electricity bill. Read starting and ending meter reading. The charges are as follows.

No. of Units	Consumed Rate in(Rs)

1-100	1.50 per unit
101-300	2.00 per unit for excess of 100 units
301-500	2.50 per unit for excess of 300 units
501-above	3.25 per unit for excess of 500 units

22. Write a program which copies the contents of one file to another file using command line arguments.
23. **Write a program to reverse the first n characters in a file use command linearguments.**
24. **Write a program to find total marks of individual student and average marks for 10students using structures**.
25. Demonstrate dynamic memory allocation using malloc() and free() for creating an array during runtime.
26. Write a program to read and write student records to a file, then display all records from the file.
27. Create a program that uses function-like and multi-line macros to perform arithmetic operations.
28. Define an enum for weekdays and write a program to display the name of the day based on user input.

Course Outcomes:

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

CO 1. Write computer program in C++ language**.**

CO 2. Apply knowledge of programming to solve real-world problems.

CO 3. Acquire teamwork skill for working effectively in groups.

CO 4. Prepare an organized report of the programs with necessary flowcharts.

Course Articulation Matrix

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

DLC	13251107	Electrical & Electronics Engineering Lab	0-0-2

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.
11. To determine phase and line quantities in three phase star and delta connection
12. To study of effect of open and short circuits in simple circuits
13. To plot Transistor CB characteristics (Input and Output)
14. To plot Transistor CE characteristics (Input and Output)
15. **Study the output characteristics of a solar PV panel under varying conditions**
16. **Develop a simple IoT system to monitor temperature and humidity using sensors.**

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
CO2 **Collect** experimental data accurately and effectively in ethical manner
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	2	2	3	3	3	3	2	1	1	1	2	2	1
CO2	2	3	2	3	2	3	2	3	1	2	1	2	2	1
CO3	3	3	3	3	2	2	2	2	2	3	2	3	2	1
CO4	1	2	2	3	1	2	2	3	3	3	2	2	2	1
CO5	1	1	1	2	1	3	3	3	3	3	2	3	2	1
CO6	2	2	2	2	3	3	3	2	3	3	2	3	2	1

1 - Slightly; 2 - Moderately; 3 – Substantially

PBL	13241109	Micro Project-1	0-0-2

List of Projects

1. Demonstration of Series and Parallel Circuit
2. Designing Staircase Wiring using Two-Way Switch
3. Implementation of a Simple Electric Power Socket
4. Development of a Basic Electric Fuse Tester
5. Simple Relay-Based Switch Control
6. Smart Energy Meter Reading Demonstration
7. Estimation of Domestic Load and Power Consumption
8. Design and Development of a USB-Powered Electric Socket
9. Design and Implementation of Wireless Mobile Charging System
10. Design of system for measurement of flow of Water in a Pipe Water Flow
11. Design and Implementation of an IoT-Based Liquid Level Monitoring System
12. Development of a PIN Diode-Based Fire Detection System
13. Designing and Implementing an Alert System for Machine Overheating Detection
14. Design and Development of a USB-Powered Electric Socket
15. Design and Implementation of an IoT-Based Liquid Level Monitoring System
16. Design and Implementation of an Automatic Night Light
17. Development of a Battery Level Indicator System
18. Design and Optimization of a Touch-Activated Light Switch
19. Design and Implementation of an Automatic Night Light
20. Development and Implementation of a Simple DC Motor Speed Controller
21. Implementation of a Smart Doorbell with Sound and Light Integration
22. Optimization and Implementation of a USB Mobile Charger
23. Design and Development of a Simple Solar-Powered Light
24. Designing and Implementing an Alert System for Machine Overheating Detection
25. Design and Development of a Simple Solar-Powered Light
26. Development of a Smartphone Stand with Video Calling & Recording Capabilities
27. Design and Implementation of an Infrared (IR) Remote Control System
28. Implementation of countdown clock and timer in python
29. Development of a Temperature-Controlled Fan
30. Design and Optimization of a Simple Capacitive Touch Sensor
31. Development and Implementation of a Solar-Powered Mobile Charger
32. Design and implement operations on Doubly Linked List (DLL) with professor data
33. Design and Development of a Motion-Activated Security Light
34. Optimization of a Basic LED Traffic Light System
35. Development of a Simple Touch Dimmer Circuit
36. Design and Development of a Mini Emergency Light
37. Design and implement operations on Doubly Linked List (DLL) with professor data
38. Development of a Simple Burglar Alarm Using LDR
39. Development of a Simple Burglar Alarm Using LDR
40. Design and Development of a Rainwater Alarm System

41. Program to design a Snakes game
42. Design and Development of a Mini Emergency Light
43. Development of a Simple Touch Dimmer Circuit
44. Program to implement an Online Voting System using a graph and linked list
45. Implementation of a Solar Battery Charger
46. Implementation of a Clap Switch Circuit
47. Program to implement an Online Voting System using a graph and linked list
48. Design and Implementation of an Automatic Street Light
49. Design of a Simple Metal Detector
50. Development of a Simple Sound Level Meter
51. Development of an Electric Fuse Tester
52. Development of a Series and Parallel Circuit
53. Design and Development of a Simple DC Motor Control
54. Design and Implementation of a 2-Way Switch
55. Program to design a Snakes game
56. Design and Implementation of a 2-Way Switch
57. Implementation of a Simple Power Supply
58. Design and Implementation of a Simple Relay Control Circuit
59. Design and Implementation of a Fan Speed Controller
60. Development of Crop detection & prediction system using Python
61. Implementation of a Temperature Sensor Circuit
62. Development of an Automatic Room Light Controller
63. Design and Development of a Current Flow Detector
64. Development of Crop detection & prediction system using Python

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

- **CO 1.** Formulate the real-world problems.
- **CO 2.** Express the technical ideas, strategies and methodologies.
- **CO 3.** Utilize the new tools, algorithms, techniques to obtain solution of the project.
- **CO 4.** Prepare oral demonstrations.
- **CO 5.** Write a project report.

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	2	2	3	3	3	3	3
CO2	3	3	3	3	2	2	1	2	2	3	3	3	3	3
CO3	3	3	3	3	2	2	2	2	2	3	2	3	3	3
CO4	1	1	1	1	2	2	2	2	2	3	2	3	3	3
CO5	1	1	1	1	1	1	2	3	3	3	3	3	3	3

1 - Slightly; 2 - Moderately; 3 – Substantially