PROFESSIONAL SKILLS & COMPETENCIES: 2130713
(Activity Based Learning)

COURSE OBJECTIVES
- To equip students with essential professional competencies.
- To develop analytical and technical skills.

Module 1: Communication Skills
Verbal Communication: Public speaking, Group discussions, and Interview handling. Non-verbal Communication: Body language, Gestures, Listening skills. Written Communication: Résumé writing, Email etiquette, Cover letters, Report Writing. Presentation Skills: Visual aids, Audience engagement, Delivery techniques.
English (Verbal Ability): Passage/Sentence Rearrangement, Error Detection and Correction, fill in the Blanks, Reading Comprehension Passages, Sentence Completion, Synonyms and Antonyms, Words Completion, Para jumbles etc.

Activities: Mock interviews and GDs, Email & résumé writing workshops, Peer review and instructor feedback.

Module 2: General Aptitude
Quantitative Aptitude: Number systems, Ratios, Percentages, Averages, Time & Work, Probability. Logical Reasoning: Series, Puzzles, Syllogisms, Direction sense, Blood relations. Data Interpretation: Tables, Pie charts, Graphs.

Activities: Weekly quizzes, Group problem-solving sessions, Timed mock aptitude tests.

Module 3: Basic Coding Skills
Basic Programming Concepts, Syntax and semantics, Input/output handling, Variables, data types, Loops. Functions and recursion. Arrays, strings. Sorting and searching, Pointers (C/C++) / References (Java/Python). Exception handling (Java, Python).

Activities: Technical round based Weekly coding exercises, Mini hands-on projects, Error debugging practice, Mock technical tests.

Module 4: Competitive Coding Skills
Introduction to Data Structures: Linked Lists (Singly, Doubly), Problem solving using linked lists. Stacks, Queues, Trees (Binary, BST, basic traversals), Heaps (Min/Max heap concepts), Graphs (Adjacency list/matrix, BFS, DFS), Sets (HashSet, TreeSet). OOPS concepts: Encapsulation, Abstraction, Inheritance and Polymorphism. Introduction to Databases, ER-model, basics of SQL.Version Control: Git, GitHub.

Activities: Weekly coding contests, Problem solving on competitive coding platforms like Leetcode, Codeforces, Hackerrank etc., Peer-to-peer code review, Mock technical interviews.

Module 5: Discipline Specific Tools*
MATLAB, Simulink, Multisim, Homer, Proteus, LTspice,
Activities: Tool-based lab exercises, Branch-specific mini projects, Short presentations on use-cases of tools in industry.

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COURSE OUTCOMES

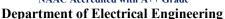After completion of the course students will be able to:

CO1 Demonstrate effective communication strategies in professional scenarios including interviews and group discussions.

CO2 Solve real-world quantitative and logical reasoning problems with time-bound accuracy.

CO3 Implement basic algorithms using standard programming languages.

CO4 Design efficient algorithmic solutions to solve coding problems.

CO5 Apply discipline-specific tools to simulate, model, or develop solutions relevant to core engineering problems.

CO-PO Mapping Matrix											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1								1	3	3		2
CO2	2	3				2		1				2
CO3	3	2			2							2
CO4	3	3	3	2	2							2
CO5	2	2	2	2	3	3	1				1	2

Industrial Automation Lab: 2130711

List of Experiments

1. To Realize Logic Gates using PLC ladder programming.

2. To observe the Timer and Counter operation in PLC using toggle switch.

3. To Realize the Doorbell operation using push buttons at door or main gate.

4. To observe the performance of starter control for 3 phase slip ring induction motor.

5. To control the sequential operation of four motors with delay times.

6. To observe the traffic light control in different traffic density.

7. To observe the automatic parking system with sensors control.

8. To understand working model of lift elevator simulator using PLC control.

9. To understand working model of Conveyer belt using PLC control.

10. To understand working model of Rotary Transfer Unit using PLC control.

11. To Implement Water Tank Level Control Using Sensors and PLC

12. To implement automate water filling and draining based on upper and lower-level sensors.

13. To Simulate Bottle Filling System Using PLC and Proximity Sensor

14. To Design Automatic Staircase Lighting System Using Timer in PLC

15. To Control Automatic Railway Gate Operation Using PLC and Sensors

16. To Implement Temperature Control System Using Thermocouple Sensor and PLC

17. To Develop an Automatic Irrigation System Using Moisture Sensors and PLC

18. To Simulate Automatic Room Light Control Using Motion Detection Sensors

19. To Create an Automatic Toll Collection Simulation Using PLC and RFID

Course Outcomes:

After completing the course, the students will be able to
CO 1. Analyze industrial automation system with using PLC
CO 2. Develop ladder logic for simple automation tasks
CO 3. Develop small application using PLC & sensors to the real world
CO 4. Demonstrate the ability to work collaboratively on automation projects, interpret industrial process requirements, and implement appropriate control logic.