



KLS Vishwanathrao Deshpande Institute of Technology

(Accredited by NAAC with "A" Grade)

(Approved by AICTE, New Delhi. Affiliated to VTU, Belagavi)

(Recognized Under Section 2(f) by UGC, New Delhi)

Udyog Vidya Nagar, Haliyal – 581329, Dist.: Uttara Kannada

Phone: 08284-220861

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

www.klsvdit.edu.in

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Add-on course list for AY 2025-26 (ODD Semester)

Sl. No.	Semester	Add-on course title	Faculty
1	3	Spoken Tutorial course on Circuit-JS	Prof. Prakash Chavan
2	5	Spoken Tutorial course on E-sim	
3	7	Introduction to Arduino	Prof. Sheetal M.

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Dept. of Electrical & Electronics Engg
KLS's V. D. Institute of Technology
HALIYAL-581 329.

Addon Course Syllabus

Academic Year: 2025-26

KLS VDIT Haliyal Department of Electrical and Electronics Engineering SEMESTER – VII		
INTRODUCTION TO ARDUINO		
Course Learning Objectives: <ul style="list-style-type: none">To understand basics of Arduino IDE.To understand basics of Arduino programming.To understand how to interface different peripherals and control them with Arduino.		
Sl. No.	Experiments	Duration
1	Introduction to Arduino Uno. Arduino Uno specifications, I/O ports, Introduction to IDE, Blink with internal LED, Blink with external LED.	03 Hours
2	Read digital input with Arduino Uno, pull up and pull down, Control LED with push button, Switch bounce.	03 Hours
3	Read analog input with Arduino Uno, control light with LDR, analog in serial out, interfacing thermistor and humidity sensor.	03 Hours
4	Interfacing 16*2 LCD with Arduino, Displaying a string.	03 Hours
5	Interfacing Real Time Clock (RTC) with Arduino, Alarm clock with Arduino.	03 Hours
6	Interfacing Gas sensor with Arduino.	03 Hours
7	Interfacing IR obstacle sensor and Ultrasonic sensor with Arduino.	03 Hours
8	Interfacing fire sensor and servomotor with Arduino.	03 Hours
9	Introduction to IoT and NodeMCU.	03 Hours
10	Controlling NodeMCU with blink app.	03 Hours
Total		30 Hours
Course Outcomes: <p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none">Write a programme for specific application using IDE.Interface different peripherals and control them with Arduino.		
Conduct of Practical Examination: <p>One objective type (MCQ) examination will be conducted at the end of the semester for maximum of 10 Marks.</p>		
Syllabus prepared by: Prof. Sheetal N. Mindolkar		Approved by: Prof. Varaprasad Gaonkar



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Add-on course list for AY 2025-26 (EVEN Semester)

Sl. No.	Semester	Add-on course title	Faculty
1	4	Fire Safety	Prof. Deepak Lokare
2	4	Introduction to Arduino	Prof. Sheetal Mindolkar
3	6	Fundamentals of Electrical Vehicles Technology	Prof. Manjunatha (T) Prof. Prakash Chavan (L)
4	6	Programmable Logic Controllers	Prof. Rajeshwari Nanannavar

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Doc. No.: VDIT/ACAD/CP/01a

Rev.No.:03

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Rev. Dt:
25/03/2021

SYLLABUS

B. E. in Electrical & Electronics Engineering

Add-on Course: Fire Safety Engineering

Staff Name: Prof. D V LOKARE

Semester - IV

Number of Hours/Week: 02

Total Hours: 30

Course Learning Objectives:

1. To learn fundamental aspects of Fire Safety Engineering.
2. To learn utilization of free and commercial soft wares used for fire safety engineering.
3. To learn protection schemes and advances in fire safety engineering.

Module 1:

FIRE SAFETY FOUNDATIONS - Definitions, Scope and nature, the moral, legal and financial reasons for promoting good standards of safety within an organisation.

Introduction to Fire Safety Engineering: Causes of Fire, Environmental aspects, classification of fire, Fire properties of solid, liquid and gas – Fire spread – Toxicity of products of combustion , Importance of Fire safety. **10 hours**

Module 2:

Components of Fire Safety Engg.: Fire Extinguishing system, Fire Alarm System, Sensors, Fire load –Fire resistance materials and fire testing – Structural Fire protection – Exits and egress. Explosion protection systems – Explosion parameters – Explosion suppression system based on CO₂ and Halon – Hazards in L.P.G handling Safety equipments - Safety helmet, belt, hand gloves, goggles, safety shoe, gum boots, ankle shoes, face shield, nose mask, ear plug, ear muff, apron and leg guard- Residential industries plans for fire safety and in emergency ,Fire protection during emergency situations-equipments and working ,Fire hose station detail, Water spraying methods, Fire-sprinkler-system . **12 hours**

Module 3:

Fire Detection Systems: Automatic Fire Detection Systems, Radiation Detectors, Ultraviolet Flame Detector, Thermal Detectors, Smoke Detectors, Air Sampling Detector, Case Study—Fire Incident Event **08 hours**

Course Outcomes:

After learning this course student will be able to:


- 1: Understand Causes of fire and types of Fire and chemical aspects.
- 2: To analyze the operation of fire safety equipment and tools, emergency safety procedures and plans to protect people from fire hazards.
- 3: To Discuss about free and commercial software used for fire safety aspects of building vehicle schedule, chemicals study.

Textbooks:

1. Fire Safety Management Hand book : Daniel E Dulla, CRC Press-2014, third Edition.
2. Introduction to Fire Safety Management, Andrew Furness, Martin Mucket.
3. Principles of Fire Safety Engineering: Akhil Kumar Das.
4. Fire Protection Systems: A. Maurice Jones.

Addon Course Syllabus

Academic Year: 2025-26

KLS VEDIT Haliyal Department of Electrical and Electronics Engineering SEMESTER – IV		
INTRODUCTION TO ARDUINO		
Course Learning Objectives: <ul style="list-style-type: none">To understand basics of Arduino IDE.To understand basics of Arduino programming.To understand how to interface different peripherals and control them with Arduino.		
Sl. No.	Experiments	Duration
1	Introduction to Arduino Uno. Arduino Uno specifications, I/O ports, Introduction to IDE, Blink with internal LED, Blink with external LED.	03 Hours
2	Read digital input with Arduino Uno, pull up and pull down, Control LED with push button, Switch bounce.	03 Hours
3	Read analog input with Arduino Uno, control light with LDR, analog in serial out, interfacing thermistor and humidity sensor.	03 Hours
4	Interfacing 16*2 LCD with Arduino, Displaying a string.	03 Hours
5	Interfacing Real Time Clock (RTC) with Arduino, Alarm clock with Arduino.	03 Hours
6	Interfacing Gas sensor with Arduino.	03 Hours
7	Interfacing IR obstacle sensor and Ultrasonic sensor with Arduino.	03 Hours
8	Interfacing fire sensor and servomotor with Arduino.	03 Hours
9	Introduction to IoT and NodeMCU.	03 Hours
10	Controlling NodeMCU with blink app.	03 Hours
Total		30 Hours
Course Outcomes: <p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none">Write a programme for specific application using IDE.Interface different peripherals and control them with Arduino.		
Conduct of Practical Examination: <p>One objective type (MCQ) examination will be conducted at the end of the semester for maximum of 10 Marks.</p>		
Syllabus prepared by: Prof. Sheetal N. Mindolkar		Approved by: Prof. Varaprasad Gaonkar 



Addon Course Syllabus

Academic Year: 2025-26

KLS VEDIT Haliyal
Department of Electrical and Electronics Engineering
SEMESTER – VI

Programmable Logic Controller

Course Learning Objectives:

- To understand architecture of PLC & Developing Fundamental PLC Wiring Diagrams & Ladder Logic Programs
- Analyse PLC timer and counter ladder logic programs.
- Describe the operation of Math Instructions, Sequencer and Shift Register Instructions

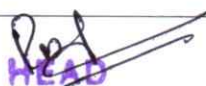
Sl. No.	Contents	Duration
1	Programmable Logic Controllers: Introduction, Parts of a PLC, Principles of Operation, Modifying the Operation, PLCs versus Computers, PLC Size and Application. Developing Fundamental PLC Wiring Diagrams and Ladder Logic Programs: Electromagnetic Control Relays, Contactors, Motor Starters, Manually Operated Switches, Mechanically Operated Switches, Sensors, Output Control Devices, Seal-In Circuits, Latching Relays, Converting Relay Schematics into PLC Ladder Programs, Writing a Ladder Logic Program Directly from a Narrative Description.	10 Hours
2	Programming Timers: Mechanical Timing Relays, Timer Instructions, On-Delay Timer Instruction, Off-Delay Timer Instruction, Retentive Timer, Cascading Timers. Programming Counters: Counter Instructions, Up-Counter, Down Counter, Cascading Counters, Incremental Encoder-Counter Applications, Combining Counter and Timer Functions	10 Hours
3	Math Instructions: Math Instructions, Addition Instruction, Subtraction Instruction, Multiplication Instruction, Division Instruction, Other Word-Level Math Instructions, File Arithmetic Operations. Sequencer and Shift Register Instructions: Mechanical Sequencers, Sequencer Instructions, Sequencer Programs, Bit Shift Registers, Word Shift Operations.	10 Hours
Total		30 Hours

Course Outcomes:

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

- Explain PLC architecture, PLC ladder diagram programming.
- Draw & write PLC ladder diagram & programming for applications using timers & counters.
- Draw & write PLC ladder diagram & programming for Math Instructions, Sequencer and Shift Register Instructions.




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Department of Electrical and Electronics Engineering

Add-On Course Syllabus (Skill Development)

Course Title: Fundamentals of Electric Vehicle Technology

Semester: 6th Semester

Total Duration: 30 Hours

Credits: Certificate Course

Contact Hours: 14 Theory + 16 Practical

1. Course Objectives

The objectives of this add-on course are to:

- Introduce fundamentals of electric vehicle systems and architecture
- Develop understanding of batteries, motors, power electronics, and charging systems
- Provide hands-on exposure to EV components and diagnostic tools
- Familiarize students with current trends, standards, and safety practices in EV technology

2. Course Outcomes

Upon successful completion, the student will be able to:

1. Explain EV types, configurations, and basic architecture
2. Describe battery types, BMS operation, and safety requirements
3. Understand working principles of electric motors and controllers
4. Identify charging standards and infrastructure requirements
5. Perform basic practical activities on EV components, software tools, and diagnostics

3. Prerequisites: (Not compulsory but desirable)

Basic knowledge of:

- Electrical & Electronics fundamentals
- Engineering Physics / Basic Machines

Syllabus

Module 1: Introduction & EV Architecture (5 Hours)

- **EV History & Evolution:** From early electric carriages to modern Tesla/BYD era.
- **Classification of EVs:** Understanding BEV (Battery), HEV (Hybrid), PHEV (Plug-in Hybrid), and FCEV (Fuel Cell).

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- **Comparison:** Performance, efficiency, and environmental impact vs. ICE vehicles.
- **EV Layout:** Block diagram of a typical EV, drivetrain configurations, and chassis integration.
- **Battery Chemistry:** Lead-acid, Lithium-ion (LFP, NMC) and future Solid-State batteries.
- **Battery Pack Design:** Cells, modules, and pack construction; series / parallel connections.
- **Battery Management System (BMS):** SOC (State of Charge) and SOH (State of Health) estimation.
- **Safety:** Battery hazards, thermal runaway, and fire suppression standards.

Module 2: Energy Storage & Battery Management (10 Hours)

- **Traction Motors:** Working principles of BLDC, PMSM, and Induction Motors (IM).
- **Motor Controllers:** Role of the Inverter and DC-DC converters functionality.
- **Speed & Torque Control:** Basics of Pulse Width Modulation (PWM) and Variable Frequency Drive (VFD).
- **Regenerative Braking:** How energy is recovered during deceleration.
- **Charging Levels:** Level 1 (Home), Level 2 (AC Public), and Level 3 (DC Fast Charging).
- **Charging Protocols:** Understanding Global Standards (CCS, CHAdeMO, GB/T, and NACS).
- **Grid Integration:** Vehicle-to-Grid (V2G) technology and smart charging concepts.

Module 3: Charging Systems & Standards (4 Hours)

- **Battery Swapping:** Pros, cons, and current infrastructure in urban mobility.
- **Telematics & IoT:** Connected vehicles, remote diagnostics, and OTA (Over-the-Air) updates.
- **Maintenance & Troubleshooting:** Common EV faults and high-voltage safety precautions.
- **Economics:** Total Cost of Ownership (TCO) and government incentives/subsidies.
- **Environmental Impact:** Life cycle analysis and battery recycling (Circular Economy).

8. Assessment & Certification

- Attendance & participation.
- Practical record.
- Viva / Quiz
- Final test / assignment

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EV Laboratory Experiments:

1. Identification of Components of an EV Two-Wheeler
2. Disassembly of External Body and Frame of an EV Two-Wheeler
3. Battery Removal, Inspection, and Reassembly in an EV.
4. Demonstration of Motor and Controller Wiring in an EV.
5. Assembly of Subsystems of an EV.
6. Performance Demonstration of an EV on Test Stand
7. Troubleshooting and Fault Diagnosis in EV.
8. Demonstration of Charging System and Safety Practices in EV.

Textbooks

1. Electric Vehicles: Technology, Modeling and Control – Amir Khajepour, M. Saber, A. Emadi (Wiley)
2. Electric Vehicle Technology Explained – James Larminie & John Lowry (Wiley)
3. Introduction to Electric Vehicles – B. R. Gupta (University Press)
4. Electric and Hybrid Vehicles: Technologies, Models, and Control – Second Edition – Amir Khajepour, M. Saber, A. Emadi (Wiley)
5. Battery Management Systems for Large Lithium-Ion Battery Packs – Davide Andrea (Elsevier)
6. Electric Vehicle Batteries: Fundamentals, Technologies and Applications – Gianfranco Pistoia (Elsevier)
7. Power Electronics: Converters, Applications, and Design – Ned Mohan, Tore M. Undeland, William P. Robbins (Wiley)
8. Electric Motor Drives: Modeling, Analysis, and Control – R. Krishnan (Prentice Hall)
9. Modern Power Electronics and AC Drives – Bimal K. Bose (Prentice Hall)
10. Automotive Technology: A Systems Approach – Jack Erjavec & Rob Thompson (Cengage)
11. Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives – Chris Mi, M. Abul Masrur, and David Wenzhong Gao (Wiley)


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