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Perundurai, Erode - 638 060, Tamil Nadu.

Association of Electrical and Electronics

Academic Year:2025-2026   Semester: Even

ELECTROTHON 2K26

HARDWARE PROBLEM STATEMENT

PS ID : 1

CATEGORY: Hardware

TITLE: Smart Energy Meter with Tampering Detection System for Rural Areas.

Electricity theft and meter tampering are common problems in rural areas, leading to high power losses for electricity distribution companies. Traditional energy meters cannot detect power theft in real time and depend on manual inspections, which are slow and inefficient.

This problem focuses on developing a smart energy meter that compares line current and load current to detect unauthorized electricity usage. When a mismatch is detected, the system should generate alerts, log the event and display real-time energy consumption on an IoT dashboard. An optional relay can disconnect the supply to prevent further losses. The solution should be low-cost, reliable and suitable for rural deployment to help reduce AT&C losses.

PS ID : 2

CATEGORY: Hardware

TITLE : Smart Hybrid Surge Detection and Backup Storage System for Power Plant.

During grid failures and power surges, solar power plants are unable to supply electricity due to the absence of backup storage and automatic switching. This leads to interruption of power to critical loads even when solar energy is available.

The objective is to design a smart hybrid system that uses solar PV with minimal battery storage to provide backup power during grid outages. The system should automatically switch between grid, solar and battery based on availability and load priority, ensuring continuous and reliable power supply.

PS ID : 3

CATEGORY: Hardware

TITLE: Battery Theft Detection in EV With Real-Time Parameters Monitoring System.

Battery theft and unauthorized disconnection are common problems in e-bikes and e-scooters. Many low-cost vehicles do not have systems to monitor battery status or prevent tampering.

The objective is to develop a battery monitoring and theft detection system that checks battery voltage and detects unauthorized battery removal. If tampering or low voltage is detected, the system activates an alarm and disconnects the load using a relay. Access is allowed only through a (eg. key or RFID-based) authentication to ensure safe and authorized operation.

PS ID : 4

CATEGORY: Hardware

TITLE: Wireless Home-Automation with Overload Protection.

Modern homes require convenient control of electrical appliances along with protection against overload conditions. Traditional switches do not provide real-time monitoring or safety features.

The objective is to develop a wireless home automation system that allows users to control appliances using a mobile app while monitoring the current consumption of each load on a cloud dashboard. When an overload condition is detected, the system automatically disconnects the affected appliance using a relay to prevent damage and improve electrical safety.

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