**Project Title:** Smart Energy Meter with Theft Detection and Load Control

**Domain:** Embedded Systems / IoT / Power Monitoring

**Objective:** To design and implement a smart energy metering system capable of real-time electricity usage monitoring, power theft detection, and remote load control via GSM communication.

**Description:** This project involves the development of a smart energy meter that can measure electrical parameters, detect anomalies like meter bypassing or unauthorized load usage, and send alerts to users or utility companies. The user can also control the load (e.g., disconnect the supply) remotely via SMS commands.

**Key Features:** - Real-time voltage, current, and energy monitoring - GSM-based alert system for power theft detection - Remote load ON/OFF via SMS commands - LCD display for local status and readings - Prepaid billing logic (optional)

**Technologies Used:** - Arduino Uno (or STM32, optional) - GSM Module (SIM800L) - Energy Metering IC (ADE7757 or equivalent) - Current Transformer (CT Sensor) - Relay Module - LCD (16x2) - Embedded C (Arduino IDE)

**Expected Output:** - Displays energy consumed on LCD - Sends SMS alert if theft is detected - Turns ON/OFF load based on SMS command - Logs energy consumption data

**Applications:** - Residential and industrial power monitoring - Smart grid systems - Prepaid energy billing

**Challenges Addressed:** - Power theft prevention - Manual meter reading elimination - Remote power management

**Scope for Future Work:** - Integration with cloud dashboard (IoT) - Mobile app control - Dynamic tariff adjustment based on usage patterns