**A logo with colorful ribbons

Description automatically generated**

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**Spring 2025 Internet of Things Systems (ITSC-305-SA1)**

**Project – Phase 1**

**Martin**

**July 17, 2025**

**Phase 1**

* Form groups, decide on your project and confirm the SDG requirement, no later than **July 17, 2025**

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**Project**

**Smart Home Energy-Saving Light Controller**

Description: By modifying light levels according to occupancy and ambient light conditions, this system maximizes illumination in a house (such as the living room, bedroom, or kitchen). By only turning lights on when necessary and turning them off when there is enough natural light, it minimizes energy waste and supports SDGs 7 (Affordable and Clean Energy) and 12 (Responsible Consumption and Production). With a web-based interface for human interaction, the system gathers data on temperature, humidity, light levels, and occupancy and sends it to an Internet of Things site for monitoring and analysis.

**Requirements needed:**

**Sensors**:

**Infrared Motion Sensor** - To ascertain whether lighting is required, an infrared motion sensor (such as the HC-SR501) detects the presence of people in the space. linked to a GPIO pin for digital input, such as GP15.  
**Photoresistor -** To determine whether artificial illumination is required, a photoresistor (LDR) measures the intensity of the surrounding light. connected via a 10kΩ resistor and a voltage divider circuit to an ADC pin (such as GP26).  
**Temperature and Humidity Sensor** (such as the DHT11 or DHT22): Keeps track of the temperature and humidity in the room to make sure that lighting settings are comfortable. linked to a GPIO pin (such as GP14) in order to transmit data.  
**Thermistor** - Connected to a different ADC pin (such as GP27) via a voltage divider, the thermostator (optional redundancy) provides accurate temperature readings to cross-check the temperature and humidity sensor.

**SDG Requirement**

**SDG 7 (Affordable and Clean Energy):** By only turning lights on when occupancy is detected and natural light is insufficient, the system lowers electricity use. Lights should be dimmed to match surrounding light levels to prevent overuse. For instance, lights that are left on longer than necessary can consume 10–15% of electricity in a typical home; our method reduces this waste.

**SDG 11 Sustainable Cities and Communities: "**Make cities and human settlements inclusive, safe, resilient, and sustainable" is the goal of SDG 11. Among other goals, it emphasizes enhancing urban living through energy-efficient construction, sustainable infrastructure, and the availability of safe and reasonably priced housing. By encouraging energy-efficient and sustainable activities in homes—which are essential components of urban and community environments—the Smart Home Energy-Saving Light Controller advances SDG 11.

**SDG 12 (Responsible Consumption and Production):** By managing lighting based on real-time data, encourages the effective use of resources. It uses web interface advice to promote sustainable practices (e.g., "Use LED bulbs for greater efficiency").