

# **BALLARI INSTITUTE OF TECHNOLOGY AND MANAGEMENT**

## **DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**PROJECT NAME: SMART JUNCTION BOX BASED ON IOT**

### **PROJECT GUIDE AND MENTOR:**

Mrs. Shilpa K R

### **PROJECT ASSOCIATES:**

- |                   |            |
|-------------------|------------|
| ➤ NAGARJUNA       | 3BR21EC405 |
| ➤ RAGHAVENDRA.L.C | 3BR21EC409 |
| ➤ SAI ABHISHEK.B  | 3BR21EC411 |
| ➤ YALLAPPA.N.H    | 3BR21EC415 |

## OBJECTIVES:

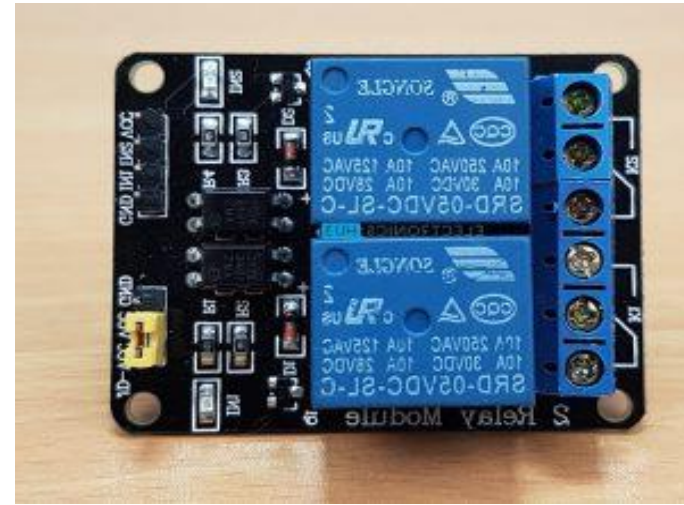
- Remote monitoring and control: The smart junction box aim to enable remote monitoring and control of electrical connections and devices. This objective involves developing a system that allows users to access and manage the junction box's functionality from anywhere, using a web or mobile interface.
- Enhanced safety and security: The smart junction box should prioritize safety and security. This objective includes implementing features such as surge protection, fire detection, and secure communication protocols to prevent unauthorized access or tampering.
- Overall, the objectives of a smart junction box based on IoT aim to improve monitoring, control, safety, and maintenance of electrical infrastructure through the integration of sensors.

# INTRODUCTION:

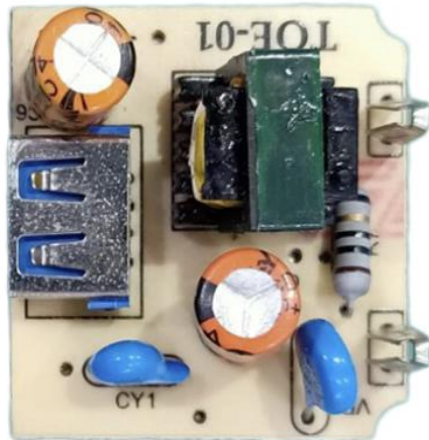
- Home Automation has always been an inspiring project for most of us. Toggling an AC load from the comfort of our chairs or bed in any room without reaching for the switch in another room.
- A Junction Box whose switches can be toggled remotely using your Phone or Computer with an active internet connection.
- This project is capable of toggling any two AC loads whose current rating is not more than 5A or ~800Watts.
- Once you understand the concept you can extend the number of AC loads by using advanced ESP modules and also increase the power rating of the loads by using high-rating relays.

## COMPONENTS USED:

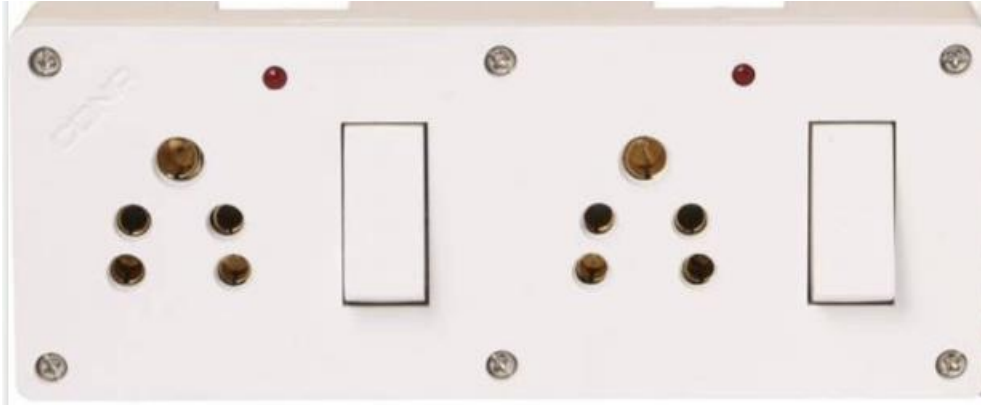
### 1. RELAY MODULE



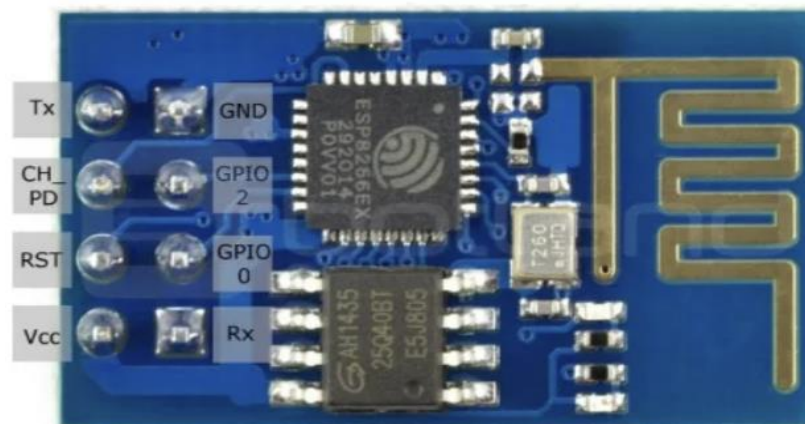
### 2. AC-TO-DC CONVERTER



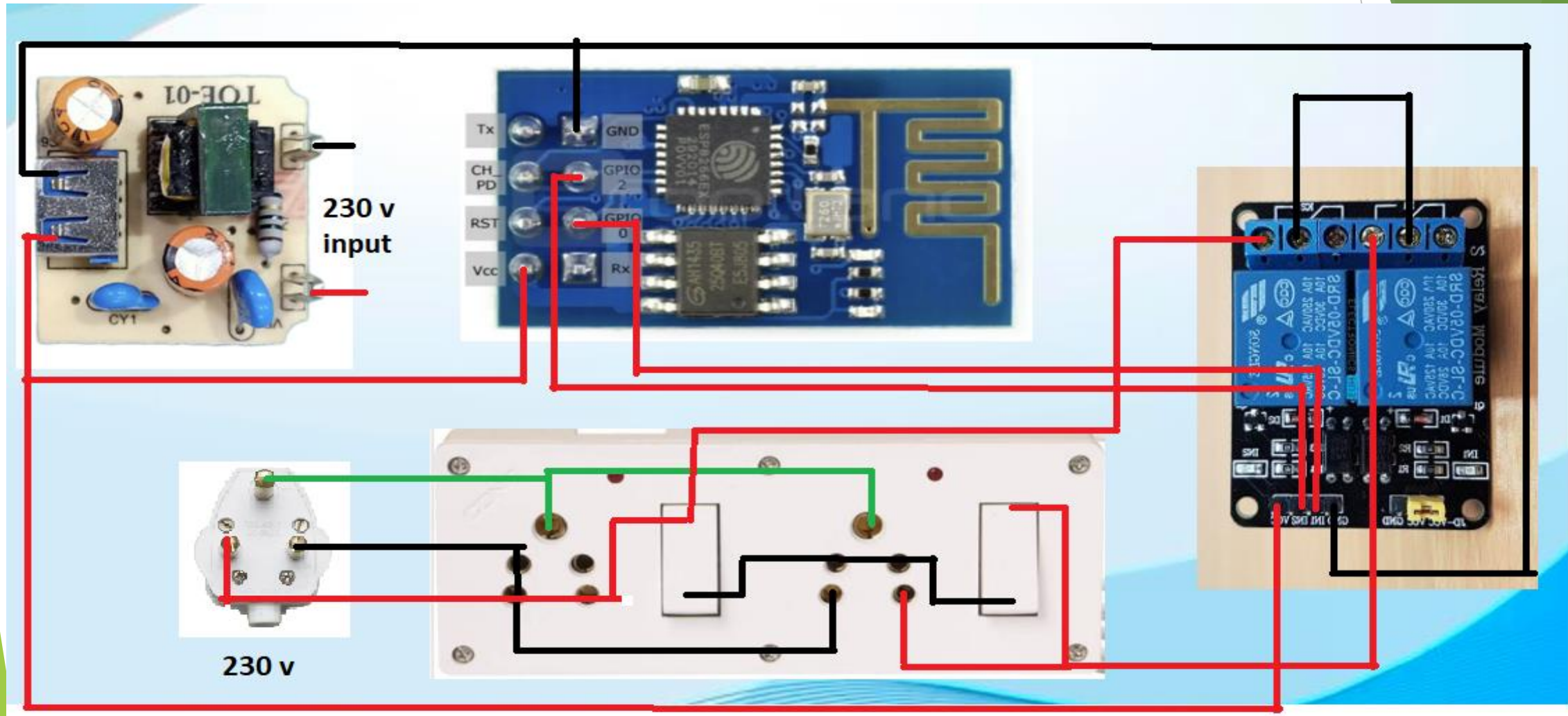
### 3. JUNCTION BOX



### 4. ESP8266WIFI MODULE



# CIRCUIT DIAGRAM:



## WORKING:

- A smart junction box is a device that includes several components such as relays, an AC to DC converter, an ESP8266 microcontroller, and a switchboard.
- The relays control the flow of electrical current to different devices or circuits.
- The AC to DC converter converts the incoming alternating current (AC) to direct current (DC) for powering the components.
- The ESP8266 enables connectivity to a network or the internet, allowing remote control and automation of the connected devices.
- The switchboard provides manual control over the devices. A smart junction box enables advanced functionalities like automation, remote control, and integration with other systems.



# APPLICATIONS:

- Smart Homes
- Energy Management
- Industrial Automation
- Smart Grids
- Building Management Systems
- Renewable Energy Systems



## ADVANTAGES:

- Remote control capabilities for managing devices from anywhere.
- Enhanced safety with the ability to monitor and control electrical devices.
- Improved functionality and customization options compared to traditional junction boxes.
- Automation: Smart junction boxes automate the operation of connected devices, reducing manual effort and enhancing convenience.
- Scalability: Smart junction boxes are scalable, allowing users to add or remove devices as needed without significant infrastructure changes.
- Future-Proofing: By adopting smart junction boxes, users can stay up-to-date with emerging technologies and advancements in smart homes or building systems.

# **LIMITATIONS:**

- Higher cost compared to traditional junction boxes.
- Increased complexity in installation and maintenance.
- Dependency on technology, susceptible to failures or network disruptions.
- Security risks, vulnerable to hacking or unauthorized access.
- Limited compatibility with existing systems or devices.

## CONCLUSION:

Furthermore, the advanced safety features of smart junction boxes help prevent electrical accidents and minimize the risk of damage to equipment and infrastructure. This ensures the safety of both the electrical system and the people using it. Overall, smart junction boxes are an essential component of modern electrical systems. Their ability to monitor, analyse, communicate, and control makes them a valuable tool for optimizing energy efficiency, improving system performance, and enhancing safety.

***Thank you..***