

**Design of door locking system using Node mcu**

Submitted in partial fulfillment of the Requirement for the award of the Degree of

**BACHELOR OF TECHNOLOGY IN**

**Electronics & Communication Engineering**

**ELECTRONIC WORKSHOP-III  
(18EC2214)**

**PROJECT REPORT**

**By**

**D.SAI RAGHAVENDRA      180040130**

**N.SATISH                      180040132**

**Under the Guidance of**

**K.V.SOWMYA**

**Assistant Professor**

**Department of Electronics and Communication Engineering  
(DST - FIST Sponsored Department)**

**KONERU LAKSHMAIAH EDUCATION FOUNDATION**

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**(NAAC Accredited “A++” Grated University)**

**Green Fields, Vaddeswaram Guntur District,**

**A.P., India – 522502**

## DECLARATION

We D.SAI RAGHAVENDRA(180040130),N.SATISH(180040132)

students of B. Tech under Department of Electronics and Communication, K L University, Vaddeswaram , hereby declare that all the information furnished in this report is based on our own intensive research and is genuine.

This report does not, to the best of my knowledge, contain part of our work which has been submitted for the award of our degree either of this university or any other university without proper citation.

D.SAI RAGHAVENDRA      180040130

N.SATISH                      180040132



K L E F

DEPARTMENT OF ECE

ELECTRONIC WORKSHOP-III (18EC2214)

### CERTIFICATE

This is to certify that the project based laboratory report entitled “HEART RATE MONITORING USING HEART RATE SENSOR WITH ARDUINO” submitted by D.SAI RAGHAVENDRA-180040130, N.SATISH-180040132, to the Department of Electronics and Communication Engineering, KL University in partial fulfillment of the requirements for the completion of a project based Laboratory in “ELECTRONIC WORKSHOP-III” course in II year B Tech II Semester, is a bonafide record of the work carried out by him/her under my supervision during the academic year 2019 – 2020.

Signature of Course Instructor

Signature of the Course Coordinator

Signature of HOD

## ACKNOWLEDGEMENT

It is great pleasure for me to express my gratitude to our honorable President Sri. Koneru Satyanarayana, for giving the opportunity and platform with facilities in accomplishing the project based laboratory report.

I express the sincere gratitude to our principal Dr.K.Subba Rao for his administration towards our academic growth.

I record it as my privilege to deeply thank our pioneer Dr.M.SUMAN, Prof & Head of the Department for providing us the efficient faculty and facilities to make our ideas into reality.

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I express my sincere thanks to our project supervisor Mrs.K.V.Sowmya for his novel association of ideas, encouragement, appreciation and intellectual zeal which motivated us to venture this project successfully.

Finally, it is pleased to acknowledge the indebtedness to all those who devoted themselves directly or indirectly to make this project report success.

D.SAI RAGHAVENDRA      180040130

N.SATISH      180040132

## ABSTRACT

- Student understanding of the link between theory and application has always been a critical objective in electronics education.
- Security is the main issue that must be addressed in the present society. With the latest developments in emerging technologies, IoT stands out to be the Cutting-Edge technology solving many security related problems. Here is a Home security solution based on IoT.
- Generally, we forgot to close the door during night times . Our project deals with this problem .
- So in this project, we are going to make an **IOT based Door Lock System using NodeMCU**, Solenoid Lock, Here NodeMCU will act as the main controller and connect the user to the door lock system using the Internet.
- This allows the user to lock/unlock his Home's door lock by using a smartphone from anywhere in the world.
- In our project we use mainly four components , Node MCU , servo motor ,12 v Relay, solenoid lock and LDR ( light dependent resistor ) sensor .
- Using these components we can resolve our problem.

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## CHAPTER1: INTRODUCTION

As mentioned, the aim of this project is to solve one of the security issues prevailing in the present society. It has been very difficult for people to have better security solutions even though in the improved technological situations.

IoT has proven to provide many security solutions and this paper proposes an optimum solution addressing on such issue. Various systems have already been proposed in the field of home automation using Bluetooth, ZigBee and RF modules.

All the previous systems lacked wide range of accessibility, secure alert system and Monitoring system. In this system, it is not the lock but a brand-new Door is made with good mechanical arrangement and Robust locking system without losing the original essence of the Door.

As the device is connected to Internet it can be controlled from any place with internet connectivity. This system is also embedded with Security alert system using a sensor acquisition and mobile application alerts user about the successful locking which user can monitor any point of time using mobile phone.

The mechanical arrangement of door in this system provides two locking modes.one is Normal Locking mode and the other is Advanced locking mode.

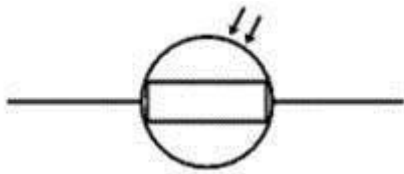
In the Normal mode, the locking system at the center of the rear face adjoining the free-corner of the door latches with the door wall mount, while in the advanced mode along with the center latch the other two locking systems present at the top and bottom of rear face of the door latches ensuring a robust contact.

## CHAPTER 2: COMPONENTS REQUIRED

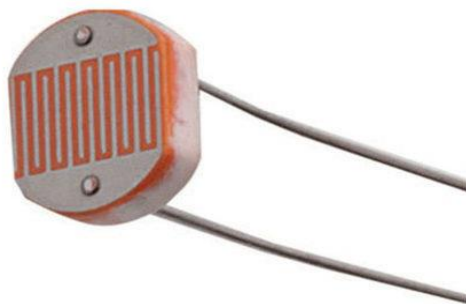
### LDR sensor:-

An **LDR** is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light **sensing** circuits. A typical **LDR**. **LDR Circuit Symbol**.

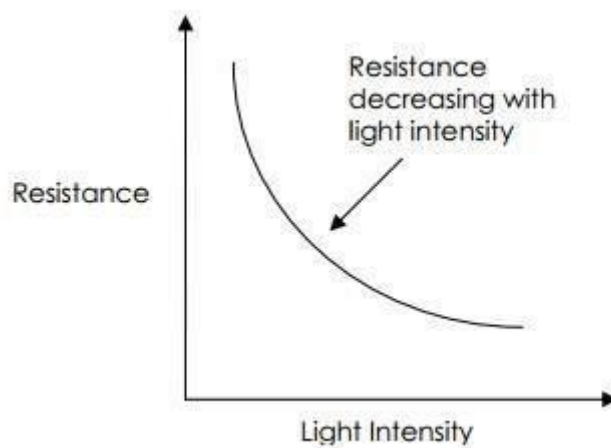
Circuit symbol:-



LDR sensor:-



Relation between LDR output and light intensity:-

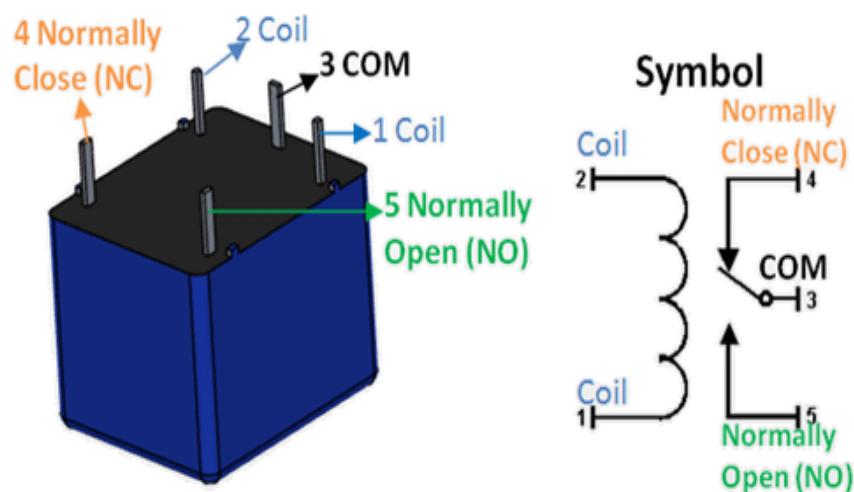




## Relay:-

A **relay** is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals.

The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.



## Servo motor:-

A **servo motor** is an electrical device which can push or rotate an object with great precision.

If you want to rotate an object at some specific angles or distance, then you use **servo motor**. It is just made up of simple **motor** which runs through **servo** mechanism.



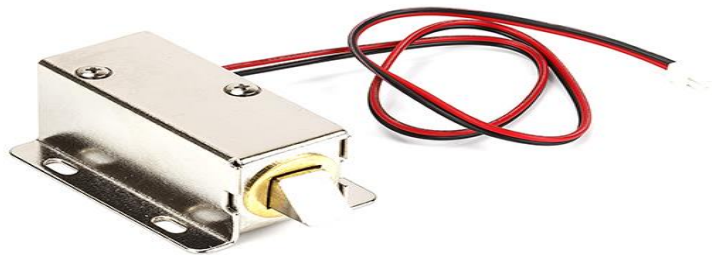
- **Solenoid lock:-**

In conventional door lock, there is key to pull or push the latch, and we have to operate it manually, but in solenoid lock, the latch can be operated automatically by applying a voltage.

Solenoid lock has a low-voltage solenoid that pulls the latch back into the door when an interrupt (Pushbutton, Relay, etc.) is activated. The latch will retain its position until the interrupt is enabled.

The operating voltage for the solenoid lock is 12V.

You can also use 9V, but it results in slower operation. Solenoid door locks are mainly used in remote areas to automate operations without involving any human effort.



- **Node MCU:-**

Since NodeMCU is open source platform, their hardware design is open for edit/modify/build.

NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip. The **ESP8266** is a low-cost [Wi-Fi](#) chip developed by Espressif Systems with TCP/IP protocol. For more information about ESP8266.

There is Version2 (V2) available for NodeMCU Dev Kit i.e. **NodeMCU Development Board v1.0 (Version2)**, which usually comes in black colored PCB.

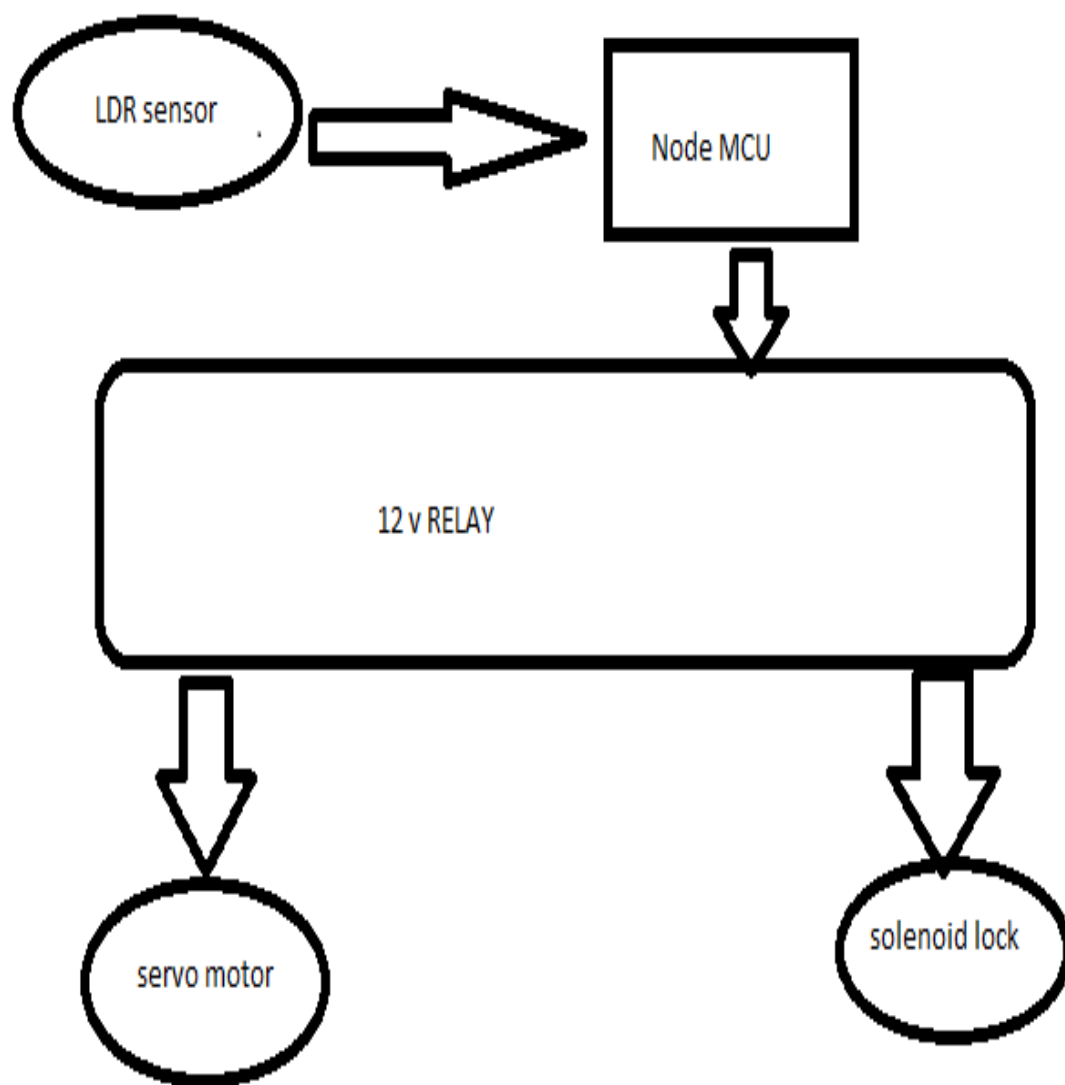
**NodeMCU** is an open-source firmware and development kit that helps you to prototype or build IoT products.

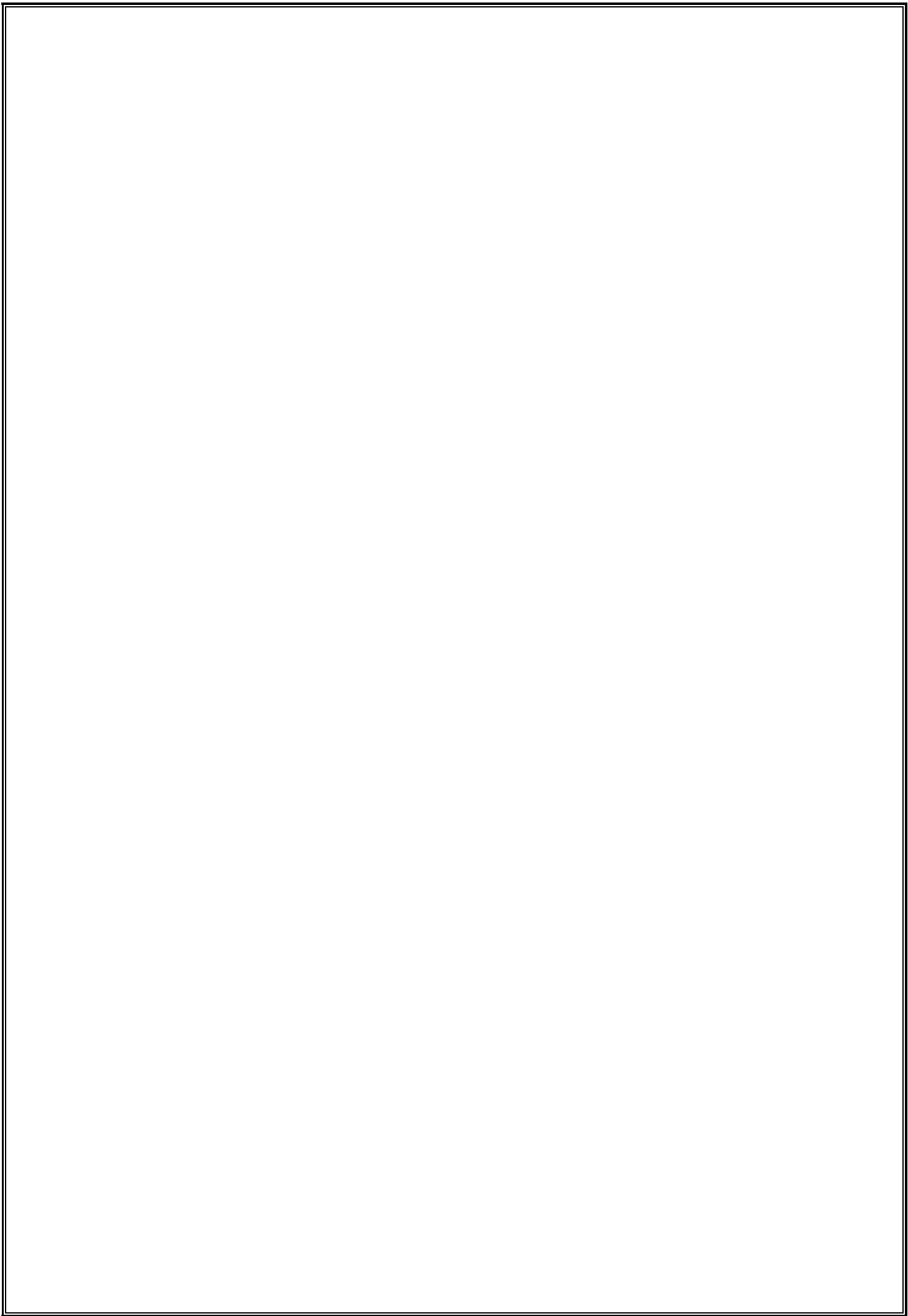
It includes firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.

The firmware **uses** the Lua scripting language.



### CHAPTER 3: Block diagram:-





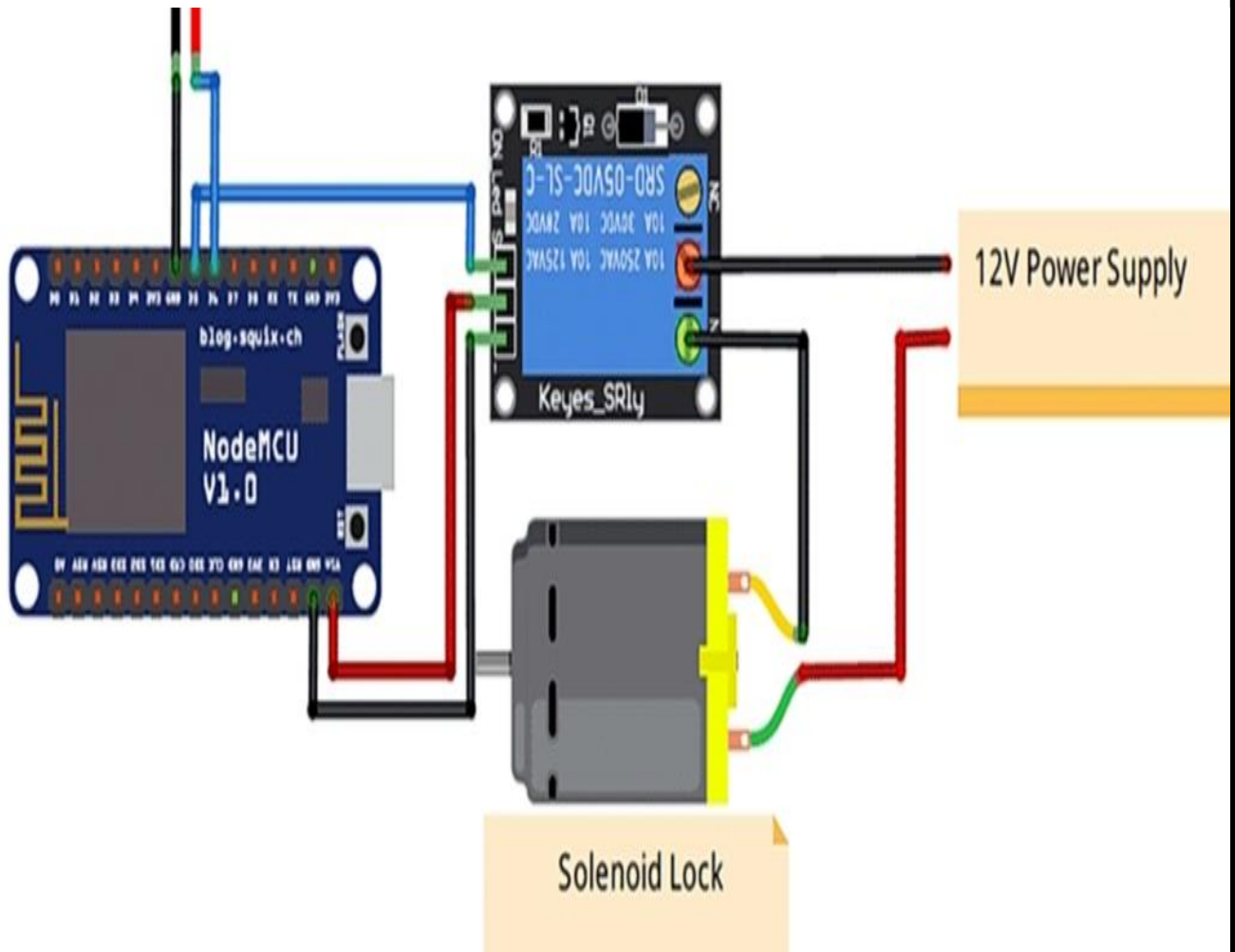
## CHAPTER 4: WORKING

- ⇒ Connect the circuit as shown in the circuit diagram.
- ⇒ Now by working of LDR we know that intensity of light is inversely proportional to output voltage , by this we can identify wheather it is day time or night time.
- ⇒ If it is night time then the code which is in node MCU is run to close the door.
- ⇒ We will close the door by running the servo motor for some time , irrespective of its door position.
- ⇒ Here we used solenoid lock to lock the door after its is been closed.
- ⇒ To run the solenoid lock we use relay to drive the lock , as the lock works under 12V power supply.
- ⇒ If we take the high voltage from node MCU then there is a chance to damage due to over heating.

## CHAPTER 5: CIRCUIT DESIGN

Circuit diagram consists of:-

- Node MCU
- Relay
- Power supply
- Servo motor





## CHAPTER 6: NODE MCU CODE

```
const int relayPin = 4;    // This  
    is GPIO4 pin which is labeled  
    as D2 on NodeMCU  
const int servoPin = 5;  // This  
    is GPIO5 pin which is labeled  
    as D1 on NodeMCU  
const int ldrPin = A0;    // LDR  
    data pin connected to Analog  
    pin 0  
void setup () {  
    Serial.begin(112500);  //Set  
        the baud rate  
    pinMode(relayPin, OUTPUT);  
    pinMode(servoPin, OUTPUT);  
    pinMode(ldrPin, INPUT);  
}  
void loop() {  
    int ldrStatus =  
        analogRead(ldrPin);  
    if (ldrStatus >=20) {  
        tone(servoPin, 1000);  
        digitalWrite(relayPin, HIGH);
```

```
delay(100);

digitalWrite(relayPin, LOW);

Serial.println("DOOR

    OPENED");

delay(100);

else {

digitalWrite(realyPin, LOW);

Serial.println("DOOR

    OPENED");

}

}
```

## CHAPTER 7: ADVANTAGES

- Less cost.
- Smaller size and weight.
- Easy to use.
- Low power consumption.
- flexible.
- Can increase security.

## CHAPTER 8: DISADVANTAGES

- Difficult to close heavy doors.
- May not work properly during rainy time ( gets darker ).
- Need check up atleast twice a week.

## CHAPTER 9: CONCLUSION

So we can also implement this or use in our day to day life for more safety purpose during night time.

➔ Every one can afford the cost and it requires less power consumption.

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## CHAPTER 10: FUTURE SCOPE

The main future scope of this device is to store the values in the cloud platform like thingspeak and get the analysis of the patient.

The data obtained from the sensor can be sent to the doctor via a wireless medium and hence the doctor could be able to monitor the patient's condition without the presence of the patient in the hospital.

If the person's heart rate is low or abnormal automatic alerts can be given to the person's emergency contacts which may include the emergency medical services thus the person's life chances can be increased in case of any sudden heart attack.

## CHAPTER 11: REFERENCES

- [1] <https://www.youtube.com/watch?v=WpYW5ncRfBs>
- [2]. <https://iotdesignpro.com/projects/iot-based-smart-door-lock-system-using-nodemcu>
- [3] <https://www.ijitee.org/wp-content/uploads/papers/v8i5/E3263038519.pdf>