



Students Innovative Project Report

**DESIGN AND DEVELOPMENT OF IOT
BASED PORTABLE BIOMEDICAL KIT
FOR HEPATITIS AND JAUNDICE**

SIP ID -2122S4482

Submitted by

SANTHOSH KUMAR. V. M – 810019105074

ROHITH. P – 810019105067

SAKTHIVEL. S – 810019105071

Guided by

Dr. P. ANBALAGAN

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING,
BHARATHIDASAN INSTITUTE OF TECHNOLOGY (BIT) CAMPUS,
TIRUCHIRAPPALLI - 620 024.**

Anna University

Sponsored by

Centre for Sponsored Research and Consultancy (CSRC)

Anna University, Chennai – 600 025.

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS
ENGINEERING,
BHARATHIDASAN INSTITUTE OF TECHNOLOGY (BIT)
CAMPUS, TIRUCHIRAPPALLI - 620 024.**

Anna University

BONAFIDE CERTIFICATE

Certified that this project Report titled “**DESIGN AND DEVELOPMENT OF IOT BASED PORTABLE BIOMEDICAL KIT FOR HEPATITIS AND JAUNDICE**” is submitted by Mr. Sakthivel .S , Mr. Rohith .P , Mr. Santhosh Kumar .V.M who carried out the work under our supervision. Certified further that to the best of my knowledge the work reported herein all the guidelines prescribed by the University was followed during and after implementation of the project.

SIGNATURE OF MENTOR

(Dr. P. ANBALAGAN)

ACKNOWLEDGEMENT

I would like to express my special gratitude and thanks to "CSRC-CENTRE FOR SPONSORED RESEARCH AND CONSULTANCY" for giving us such a wonderful opportunity.

A special mention to our dean "Dr . T. Senthilkumar" for supporting us throughout this journey.

Our thanks and appreciations also goes to our HOD "Dr . P. Anbalagan " Dept. Of Electrical and Electronics Engineering in developing the project and we also highly indebted to his guidance and constant supervision as well as for providing necessary information regarding the project & also for his support in completing the project. I would like to express my gratitude towards member of Anna University Regional Campus Tirucjirappalli for their kind co-operation and encouragement which help me in completion of this project.

SANTHOSH KUMAR V M

ROHITH P

SAKTHIVEL S

ABSTRACT

Bilirubin is a compound which is yellow in shade, happens within the ordinary catabolic pathway is the breakdown made of heme in vertebrates. This catabolism is a necessary technique inside the body's clearance of waste merchandise that get up from the destruction of aged red blood cells. There are two types of bilirubin namely Conjugated (direct) Bilirubin and Unconjugated (oblique) Bilirubin. The un-conjugated Bilirubin is Albumin-bound in serum and by no means present in urine whereas Conjugated Bilirubin is unbounded in serum and it's miles present in urine. Our proposed concept is set to determine the amount of Conjugated Bilirubin in urine. A medical kit is a collection of supplies and equipment that is used for providing medical care, especially in situations where advanced medical facilities may not be available. It can include items such as bandages, dressings, gauze, adhesive tape, scissors, tweezers, antiseptic wipes, pain medication, and other items that may be needed to provide first aid or treat minor injuries. Some medical kits are designed for specific purposes, such as survival kits or kits for travellers, while others are mare general purpose. It is important to have a medical kit on hand in case of emergencies, and to make sure that the supplies are regularly checked and replenished as needed.

A urine analysis device is a tool that is used to test urine for various chemical and biological markers. These markers can provide information about a person's health and can help diagnose or monitor various medical conditions. There are several types of urine analysis devices available, including Dipsticks, cups or bottles and testing devices. Testing devices are portable devices that can be used to test a urine sample on the spot. They typically use a combination of chemicals and sensors to detect the presence of various markers in the urine. It is important to follow the manufacturer's instructions when using a urine analysis device, as the accuracy of the results can depend on proper use of the device. There are several methods for performing a bilirubin analysis, including spectrophotometry, which measures the amount of light absorbed by the bilirubin, and immunoassays, which use antibodies to measure the amount of bilirubin in a sample. The specific method used may depend on the type of bilirubin being measured and the equipment available.

We build here a easy electronic circuit fashioned of Light-emitting diodes and light dependent resistors that may be used for analysing bilirubin concentration. We recommend this method due to the fact the BoiLED Rice grains have the capability to absorb Bilirubin pigment. This Biomedical package is used to detect the Jaundice and Hepatitis affected sufferers via quantitative analysis of bilirubin in urine.

CONTENTS

CHAPTER	TITLE	PAGE NO
1	Introduction	
	1.1 General	1
	1.2 Introduction to Urine analysis	2
	1.3 Rational of Urine analysis	3
	1.4 Urine	4
	1.5 Bile	5
2	Literature Survey	7
3	Concept of existing model	9
4	Proposed model of Diagnostic Device	12
5	Implementation of proposal device	15
6	Hardware Description	
	6.1 Light Dependent Resistor (LDR)	19
	6.2 Light Emitting Device (LED)	22
	6.3 PIC microcontroller	28
	6.4 Internet Of Things (IOT)	43
	6.5 Power supply	55
	6.6 Transformer	57
	6.7 Rectifier	58
7	Software	
	7.1 Software Description	62
	7.2 Arduino IDE	62
	7.3 Arduino Programming	64
8	Results & Conclusion	83
9	Future Enhancement	85
10	Reference	86

TABLE OF FIGURES

FIGURE	TITLE	PAGE NO
4.1	Block Diagram Of Implemented Model	13
5.1	Voltage Divider Circuit	15
5.2	Schematic Diagram Of Implemented Model	16
5.3	Prototype Implementation	17
6.1	LDR Circuit Diagram	19
6.2	Construction Of LDR	20
6.3	Working Principle Of LDR	21
6.4	Schematic Diagram Of LDR	22
6.5	Block Diagram Of LED	22
6.6	Cross Sectional View Of Diffused LED	23
6.7	Sectional View Of LED	24
6.8	Working Of LED	24
6.9	Features Of LED	25
6.10	Characteristics Of LED At Different Colours	26
6.11	Voltage Divider Formula In LED	27
6.12	Architecture Of Pic Microcontroller	28
6.13	Features Of Pic32 Microcontroller	29
6.14	Pin Diagram Of Pic16f Microcontroller	34
6.15	Circuit Diagram Of Pin 1	34
6.16	Circuit Diagram Of Pin 14	36
6.17	Architecture Of Pic16f Microcontroller	39
6.18	Digital Variable Speed-Limit Sign	48
6.19	Input And Output Ports Of Pic16f Microcontroller	51
6.20	Schematic Of Nodemcu	52

6.21	Features Of Nodemcu	54
6.22	Block Diagram Of RPS	55
6.23	Cross Section Of Battery Power Supply	56
6.24	Transformer	57
6.25	Output Waveform	59
6.26	Full Wave Bridge Rectifier	59
6.27	Output Of Bridge Rectifier	60
6.28	Output Of Single Diode Rectifier	60
6.29	Smoothing Curve	61
8.1	Tabulation Of Tested Results	83
8.2	Graphical Results	84