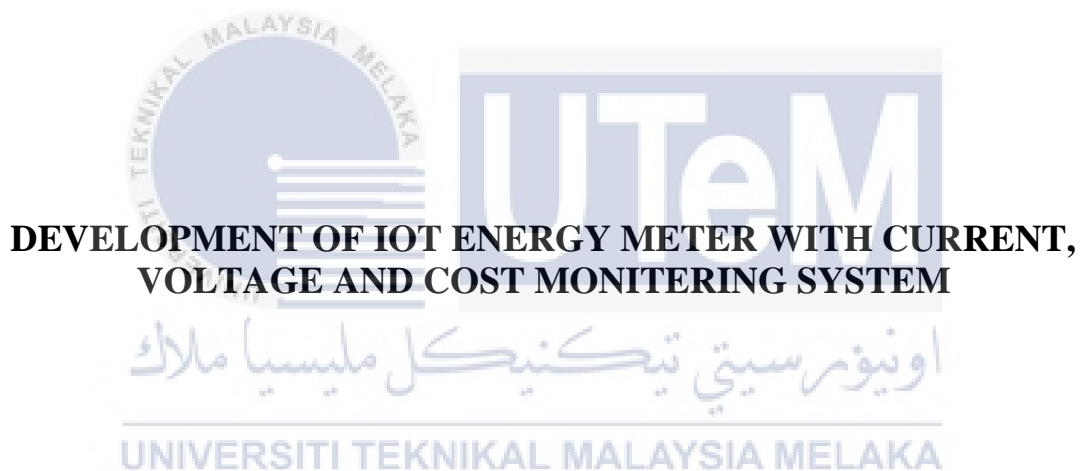




Faculty of Electrical and Electronic Engineering Technology



MUHAMMAD JAMALUDIN BIN NORAZMI

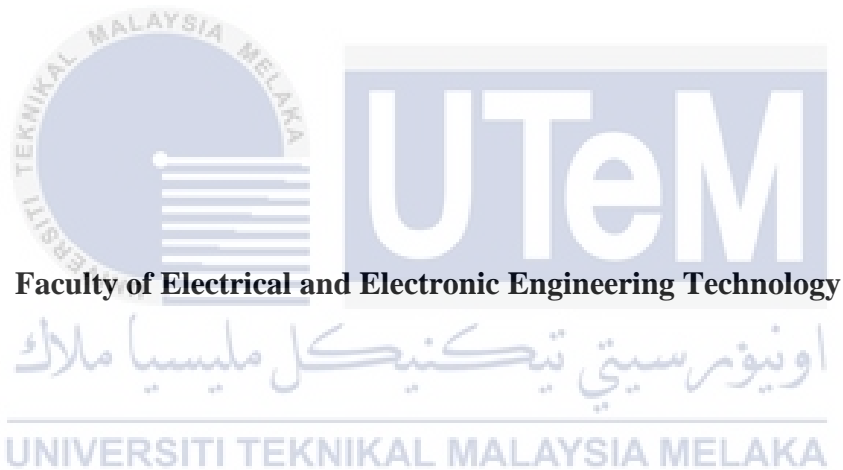
**A project submitted
in partial fulfillment of the requirement for the degree of
Bachelor of Electrical Engineering Technology with Honours**

2023

**DEVELOPMENT OF IOT ENERGY METER WITH CURRENT, VOLTAGE AND
COST MONITORING SYSTEM**

MUHAMMAD JAMALUDIN BIN NORAZMI

**A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electrical Engineering Technology with Honours**



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2023

**BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II**

Tajuk Projek: Development of IOT Energy Meter with Current, Voltage and Cost Monitoring System

Sesi Pengajian : TAHUN 4 SESI 1 2021/2023

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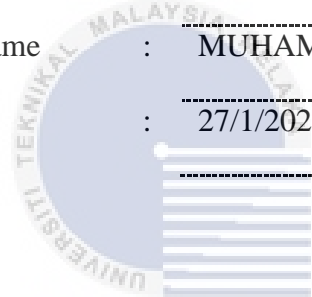


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APPROVAL

I approve that this Bachelor Degree Project 1 (PSM1) report entitled “Project Title” is sufficient for submission.

Signature : 

Supervisor Name : TS DR AHMAD ZUBIR BIN JAMIL

Date : 27/1/2023



APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electrical Engineering Technology with Honours.

Signature :



Supervisor Name : TS DR AHMAD ZUBIR BIN JAMIL

Date : 27/1/2023

Signature :



Co-Supervisor :

Name (if any) :

Date :

DEDICATION

To my beloved mother, Irma Niswati bin Amri, and father, Norazmi bin Abu Sha'ari,

and

To dearest wife, Saidatul Aishah and

*My Supervisor, TS DR Ahmad Zubir bin
jamil.*



I approve that this Bachelor Degree Project 2 (PSM2) report entitled “Development of IOT Energy Meter with Current, Voltage and Cost Monitoring System” is sufficient for submission.

Signature :

TS DR AHMAD ZUBIR BIN JAMIL

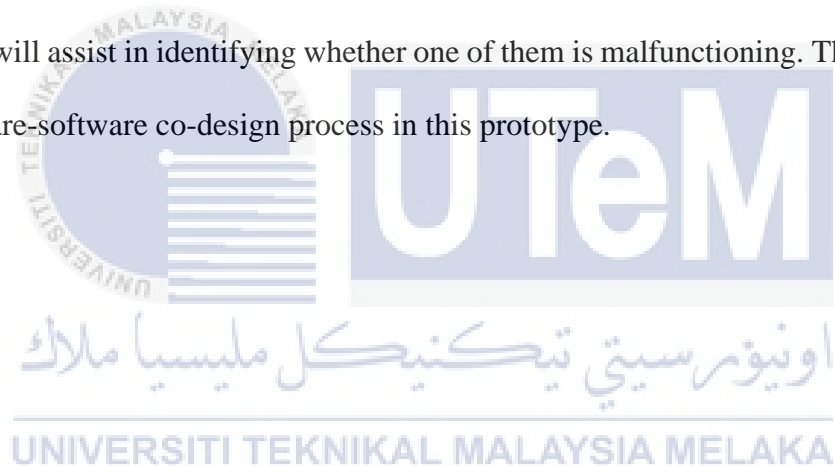
Supervisor Name :

Date : 27/1/2023



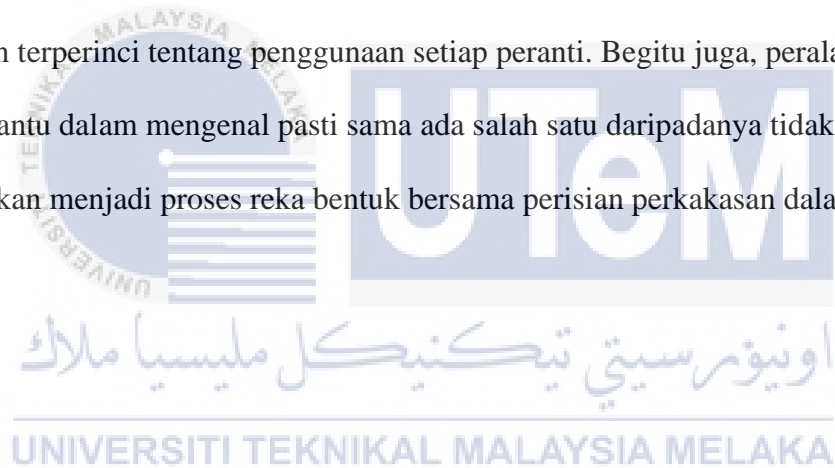
ABSTRACT

In this project, we will discuss the Energy Meter, also known as a Smart Meter with Cost Monitoring System, which is a gadget that allows us to monitor the power consumption of portable appliances and is a step toward domestic energy conservation strategies . Using voltage and current sensors, as well as ESP-32 microprocessor, this paper suggests a customisable power meter design. This meter is used to keep track of voltage, current, and cost monitoring system in real time. A reference power meter is used to calibrate the voltage and current. The microcontroller will be able to calculate projected electrical consumption and cost based on detailed knowledge about each device's consumption. Similarly, our equipment will assist in identifying whether one of them is malfunctioning. This project will be a hardware-software co-design process in this prototype.



ABSTRAK

Dalam projek ini, kami akan membincangkan tentang Meter Tenaga, juga dikenali sebagai Meter Pintar dengan Sistem Pemantauan Kos, yang merupakan alat yang membolehkan untuk memantau penggunaan kuasa peralatan mudah alih dan merupakan langkah ke arah strategi penjimatan tenaga domestik . Menggunakan penderia voltan dan arus, serta mikropemproses ESP-32, kertas ini mencadangkan reka bentuk meter kuasa yang boleh disesuaikan. Meter ini digunakan untuk menjejaki voltan, arus dan sistem pemantauan kos dalam masa nyata. Meter kuasa rujukan digunakan untuk menentukur voltan dan arus. Mikropengawal akan dapat mengira unjuran penggunaan elektrik dan kos berdasarkan pengetahuan terperinci tentang penggunaan setiap peranti. Begitu juga, peralatan kami akan membantu dalam mengenal pasti sama ada salah satu daripadanya tidak berfungsi. Projek ini akan menjadi proses reka bentuk bersama perisian perkakasan dalam prototaip ini.



ACKNOWLEDGEMENT

I would like to express our gratitude to Allah, the Most Gracious, the Most Merciful, for providing us with vigour and good health throughout our final semester at the Universiti Teknologi Malaysia Melaka campus. Thank you to God for providing us with a healthy physical and mental state that enabled us to finish this Final Year Project. A good senior project is not the result of a single person's efforts. I'd want to offer our deep gratitude to my supervisor, TS. DR. Ahmad Zubir Bin Jamil, for all the support, guidance, criticism, and friendship we've established together over the last year. We would not have been able to achieve this feat without the love and support of our family. The money donated to us by our relatives to help us brought us all together. Our family's contribution to our support provided all of the materials needed to complete the final year project. In a nutshell, thank you to everyone of our friends who have offered to assist us. The colleagues and lecturers who have helped us in a variety of ways to meet the project's requirements. Finally, we want to express our gratitude for having all of you here with us, and we sincerely appreciate it.

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LIST OF SYMBOLS

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LIST OF ABBREVIATIONS

V	-	Voltage
I	-	Ampere
P	-	Watt
	-	
	-	
	-	
	-	
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APPENDIX 1

Coding of ESP-32

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CHAPTER 1

INTRODUCTION

1.1 Introduction

. The discussion in this chapter began with an overview of the country's power meter logger study, followed by explanations of the problem statements. This chapter will also include the major objectives of the current investigation, the scope of the study, the significance of the study, and the thesis outline.

1.2 Background of Study

The meter is used to keep track of the number of units consumed, the expected cost, the Line Voltage, and the amount of current consumed. IoT Blynk is a simple web application that displays the Live Output of various IoT readings. This allows users to monitor the number of units consumed, the expected cost, the Line Voltage, and the current utilized in real time from anywhere on the site. In this way the energy meter observing framework enables client to adequately screen power meter readings and check the charging on the

Blynk app effortlessly. As a result, the energy meter monitoring system enables clients to easily monitor power meter readings and check charges on applications in the phone.

1.3 Problem Statement

Nowadays, all machines have been innovated to ease our daily activities whether at home or at work, but all these machines use electricity whether a direct current machine or a portable that have to charge after using.

- People cannot maintain the monthly budget for electricity because of over usage.
- People cannot determine which electrical equipment that use low or high power usage to minimize the used for maintaining low electricity bills.

1.4 Research Objectives

The main aim of this project is to built a energy meter system that can be read current, voltage and cost of the circuit via meter or in application on the phone. Specifically, the objectives are as follows:

- a) To read current from all loads in a circuit by using sensor.(Install at MCB)
- b) To access the reading via meter or in- application at phone in realtime by using blynk applincation
- c) To culcalate the cost of the circuit but using ESP32 microcontroller.

1.5 Scope of Study

. To avoid any uncertainty of this project due to some limitations and constraints, the scope of the project are defined as follows:

- Built for Comercial usage.
- Device have to be installed at Electrical Distribution Box.
- Internet
- Application installation in phone.

Table 1.1 Main Component Of The Project

Hardware	Software:	Method:
Arduino ATMEGA-328 - microcontroller Esp32 - Wifi Module Current sensor ACS712- measure current. AC Voltage sensor (ZMPT101B) - measure voltage.	Blynk – to developpe the and transfer data from device to applications via phone. Arduino Uno – to set the microcontroller command and intructions.	IOT - system of interrelated computing devices, mechanical and digital machines that have the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

d)

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, to study and identify the variables that can be made to select component, data and cost which will aid in the development of this project. This chapter focus on examine selected journal and research articles that connected to this project.

2.2 Overview

This project is to built the energy meter that can calculate the montly bills and also show the current reading. Basicly user can access this readings via application on the phone that will give the live price and live reading.

2.3 Smart meter

Since the early 2000s, smart meters have been installed in several nations throughout the world. The smart meter, as a crucial component of the intelligent grid, is projected to deliver economic, social, and environmental advantages to a variety of stakeholders. Smart meter principles have been extensively discussed. One of the primary criteria evaluating the success of smart meters is smart meter data evaluation, which deals with data collection, delivery, processing, and analysis that benefits all stakeholders. As home power usage continues to rise, consumers are becoming more cognizant of energy use and efficiency from both an economic and environmental standpoint.

The Smart meter is a meter that is used to measure the amount of energy used by an electric load. The entire power used and utilized by the load at a certain time interval is