

UNIVERSITI TEKNOLOGI MARA

**DESIGN AND FABRICATION OF
SMART WATERING PLANTS
SYSTEM**

MUHAMMAD ZULHELMI BIN MOHD AZRI

Dissertation submitted in partial fulfillment
of the requirements for the degree of
Diploma
(Mechanical Engineering)

College of Engineering

Feb 2024

ABSTRACT

Houseplants bring many benefits and will create good ecosystem inside our house. The plants need to be watered every day and different types of plants need different amounts of water. Sometimes, people are too busy or not at home, therefore they will leave the plants unattended. Traditional ways of watering plants can waste a lot of water. The main objective of this project is to fabricate a smart watering plants system that focusing on sustainability and self-working system. This system uses a water tank that receives two sources of water, rainwater and tap water. A float valve will be connected to the inlet of tap water. It will stop the supply just after the water level is sufficient and the rest will be filled by rainwater. A control unit will be connected to the outlet of water tank. Users need to set watering intervals and how long it takes in one watering session. A water pump was added to the system to make sure the water can reach all parts of the system. Users can set different amount of water that will be watered to every plant by using the adjustable dripper. By installing this system, the plants will get enough water consistently. It can also boost productivity in our daily life. This system can save water consumption and helpful in maintaining the sustainability of nature. Hopefully this project can encourage more people to take care of plants and lead the community towards green.

ACKNOWLEDGEMENT

Firstly, I wish to thank God for giving me the opportunity to embark on my diploma and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor, Madam Syidatul Akma Binti Sulaiman that is willing to guide me through all this time completing my project. My sincere thanks to all lecturers that are willing to share knowledge with me during this diploma. I hope that all the knowledge can make me improve myself and make me ready to face the next stage in my life. Only Allah SWT can repay the kindness all of you.

I am also grateful to all assistant engineers in UiTM Pasir Gudang that helped me directly and indirectly in completing this project. Thank you for always making sure the machines and equipment are in good condition so all of us can finish our project without any problem. To my fellow friends, thank you for being there when I needed help. I believe that I cannot complete this project alone.

Last but not least, I would like to thank my parents for giving birth to me in the first place and supporting me physically and spiritually throughout my life. This dissertation is dedicated to both of you for the vision and determination to educate me. This piece of victory is ours. Alhamdulillah.

TABLE OF CONTENTS

	Page
CONFIRMATION BY SUPERVISOR	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	xi
CHAPTER ONE : INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Objectives	2
1.4 Scope of Study	2
1.5 Significance of Study	3
CHAPTER TWO : LITERATURE REVIEW	4
2.1 Benchmarking/Comparison with Available Products	4
2.2 Review of Related Manufacturing Process	6
2.3 Patent and Intellectual Properties	7
2.4 Summary of Literature	12
CHAPTER THREE : METHODOLOGY	14
3.1 Overall Process Flow	14
3.2 Detail Drawing	16
3.3 Engineering Calculation and Analysis	18
3.4 Bill of Materials and Costing	23
3.5 Fabrication Process	28

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Lately, many Malaysians started a new hobby and interest in taking care of houseplants [1]. Many people enjoy living and working in cultivated greenspaces, and most likely having beautiful plants around. Its help reduce stress levels, help people recover from illness faster, may improve the quality of indoor air and many more [2]. A good ecosystem will exist inside the house [3].

There are a few things to keep in mind before buying a new plant [4]. The plants need to be watered every day and different types of plants need different amounts of water for their basic needs. People are not always at home, sometimes they will go on vacation and will leave the plants unattended. It is okay if only for a short vacation or for the plants that can survive with small amounts of water. But for the high-maintenance plants that require extra care [5], it will die faster if did not get enough water. If people go for long vacations such as going back to their hometown or abroad, obviously the plants will die after they come back home. Other than that, the traditional ways of watering plants waste a lot of water. This is a bad sign for the Earth.

Many people still use watering pots or water hose to water their plants. If they leave their house, some of them ask a favour from the neighbour to water their plants. There is also a DIY product, drip irrigation system using plastic bottles [6] that will drop the water little by little, but it does not last long. Hence, the smart watering plants system will be designed to outcome the current issues. This product has a control system that will water the plants consistently based on the settings set by the user. The water tank can collect rainwater, or from water tap thus it can reduce clean water consumption.

The aim of this project is to design a smart watering plants system using SolidWorks 2021 software. Then an actual product will be fabricated based on the final design. This smart watering plants system can provide good service for users while consistently helping to give basic need to the plants. Users now can fully rely on this new ‘assistance’.