**NATIONAL TECHNICAL UNIVERSITY COLLEGE OF MALAYSIA**

# AUTOMATED DEEP FRIED PRODUCTION MACHINE

Thesis submitted in accordance with the requirements of the National Technical University College of Malaysia for the Degree of Bachelor of Engineering (Honours) Manufacturing (Process)

By

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Faculty of Manufacturing Engineering

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JUDUL: AUTOMATED DEEP FRIED PRODUCTION MACHINE

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# APPROVAL

This thesis summitted to the senate of KUTKM and has been accepted as fulfillment of the requirement for the degree of Bachelor of Engineering (Honours) Manufacturing (Process). The members of the supervisory committee are as follows:

SHARIMAN BIN ABDULLAH
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# ABSTRACT

In the world towards globalization, people needs equipment that can be used to help them do their job easy, fast and effective. As a challenge, a machine that able to produce a snack food such as murukku is designed as a tool that can make people job come easy in our life. The machine which is designed base on the research development, able to make the process of produce a snack food easier than any process before. All aspect was considered to make sure the process is going smooth and clear. This machine is a combination between snack food extractor and frying pan concept which use a automation system. Conscientious and a wide range of knowledge especially in mechanical and electric engineering needed to make sure this thing become reality.



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# ABSTRAK

Dalam dunia menuju ke arah globalisasi, manusia memerlukan peralatan yang dapat di gunakan bagi membantu melaksanakan sesuatu pekerjaan dengan mudah, cepat dan berkesan. Sebagai menyahut seruan ini, sebuah mesin yang dapat menghasilkan makanan ringan seperti murukku telah direka sebagai satu alat yang dapat membantu di dalam kehidupan manusia. Mesin yang direka hasil daripada kajian dan penyelidikan yang dibuat dapat memudahkan lagi proses penghasilan makanan ringan berbanding dengan kaedah yang terdahulu. Segala aspek di kaji bagi memastikan proses pemilihan projek ini dapat di laksanakan dengan lancar dan teratur. Mesin ini merupakan gabungan kombinasi antara penekan tepung dan tempat mengoreng yang berfungsi menggunakan sistem automasi. Ketelitian dan keluasan pengetahuan di dalam bidang mekanikal dan elektrikal amat diperlukan bagi menjadikan mesin ini satu realiti



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# DEDICATION

***I humbly dedicate this to:***

***My beloved family,***

*For their relentless prayers and believing in me when nobody else would*

***My Lecturers,***

*Thank You for guiding me in my journey to success*

***My friends,***

*"I wish you'll be in success and reach our shared dream...to be an engineer "*



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# LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED NOMENCLATURE

*AC* = Alternate Current

*DC* = Direct Current

*PLC* = Programmable Logic Controller

*DDM* = The doughnut-machine

° = Radius

*F.A* = Flexible automation

*C.I.M* = Computer Integrated Manufacturing

*F.M.S* = Flexible Manufacturing Service

*P.I.D* =. Proportional Integral Derivation

*P.C.B* = Printed Circuit Board



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# CHAPTER 1
# INTRODUCTION

## 1.1 Introduction

This project involves the design and development of Automated Deep Fried Production Machine that using an automation system. The working principle of the Automated Deep Fried Production Machine is designed and the prototype of the machine is developed.

The prototype of the machine is made focusing on the mechanical movement which is conducted through automated system. The Programmable Logic Controller (PLC) is used in order to automate the prototype of the machine that has been built.

The basic devices for implementing this automation project is identified which is used in the prototype development. The chosen PLC is NAIS PLC manufactured by Matsushita, and the specific model used is FP0 and the programming tool used FPWIN GR.



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## 1.2 Project Flow Chart

In order to built a perfect and fully-funtional project, the procedure must be identified first. Figure 1.0 below shows the flow chart of the project.

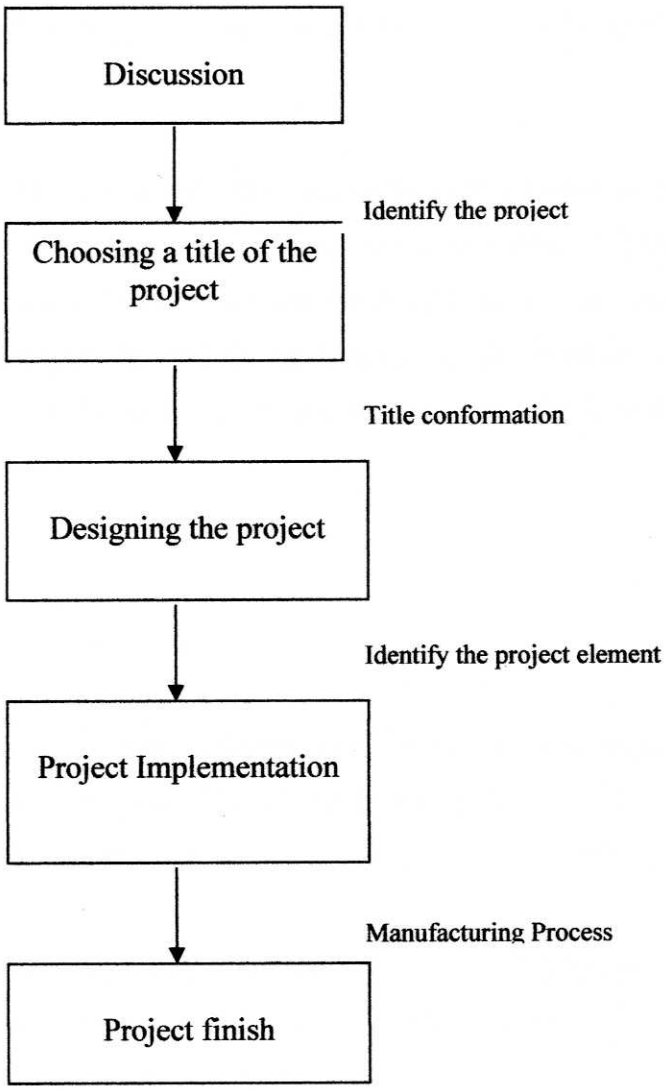


Figure 1.0 : Project Flow chart



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## 1.3 Objective of the project

This project was subjected to the problem that the people who involved in this sector especially those who make it for income. A small industry for snack food manufacturing in Malaysia is still using a traditional method in order to produce a snack food such as murukku, keropok ikan, potato chips and many more. This traditional method required a lot of a man power and observation. This will use a lot of time for produce a snack food.

As a solution for this problem, a machine that use an automatic system is created. This machine is created in order to minimize man power and reduce time to produce a snack food. Using the machine,user only need to insert the dough in the barrel and the a certain process such as dough extraction and frying is done by the machine using a automatic system. This machine can increase the production rate and minimize the man power.

## 1.4 Scope of the project

The scope of this project is to make a design and develop the prototype of the Automated Deep Fried Production Machine. It involving designing the mechanical parts and determining the electrical part that be used in developing a prototyped of the project.

The prototype development is focusing on development for the loading arm which give a main function in the operation of the machine. Another scope of the project is to develop a controller that automated the prototype.



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## 1.5 Overview of the project

Automated Deep Fried Production Machine

Automatic Deep Fried Production Machine is specially designed to fry murukku, one of the most favorite snack foods in Malaysia. The machine is using a automatic system and consists of three main parts: dough extractor, frying part and collector part. A loading arm is used to generate movement where it involves different process during the operation of the machine.

## 1.6 Advantages of the project

Advantages of this invention:

1) Easy to use
2) High quality of finished products.
3) Economy.
4) Safety.
5) Human factor (ergonomic).
6) Maintainability.
7) Obtainable price.



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## 1.7 Project Planning

The duration of completing this project spanned over 2 semester, where the task involved in each semester are described in the table 1 below

Table 1.0: Project Planning

| Project Division | Tasks |
|---|---|
| Project 1 | • Literature review about the project<br>• Design concept of Automatic Deep Fried Production Machine<br>• Design of machine prototype.<br>• Design a mechanical device for the machine<br>• Determining the mechanical and electrical part that be used in manufacturing a prototyped of the project<br>• Determining the cost of the project<br>• Presentation of Project 1 |
| Project 2 | • Manufacturing the product prototyping according to the design that have been made<br>• Learning the basics of electrical component<br>• Theoretical study of Programmable Logic Control<br>• Practical learning and testing of PLC in Automation Lab |



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| | |
|---|---|
| | • Design the automation system using PLC for the product prototyping<br>• Implementation of PLC for the prototype of the product<br>• Presentation of Project 2 |



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# CHAPTER 2
# LITERATURE REVIEW

## 2.1 Overview of the project

Automated Deep Fried Production Machine

Automatic Deep Fried Production Machine is specially designed to fry murukku, one of the most favorite snack foods in Malaysia. The machine is using a automatic system and consists of three main parts: dough extractor, frying part and collector part. A loading arm is used to bring a raw material (dough) through a different process until it become a fried murukku.

Application:

Suitable to be used in any Small-scale snack food industry

Stage of Development:

Prototype developed

Remarks:

- Production :10kg of Fried Murukku / Hour
- Raw Material : Murukku Dough, Cooking Oil
- Land : Indoor $1M^2$
- Man power : Unskilled 1



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