



اَوْبُوْ سَيِّدِيْ تَيْكُوْ لُوْ كِيْ مَارَا  
UNIVERSITI  
TEKNOLOGI  
MARA

UiTM CAWANGAN JOHOR, KAMPUS PASIR GUDANG  
FACULTY OF MECHANICAL ENGINEERING  
DIPLOMA OF MECHANICAL ENGINEERING (EM110)

**MEC332**

**MECHANICAL ENGINEERING DESIGN**

PROJECT:

**AUTOMATED KNIFE SHARPENER**

SUPERVISOR'S NAME:

**MADAM MAZLEENDA BINTI MAZNI**

LECTURER'S NAME:

**SIR FIRDAUS BIN SUKARMAN**

GROUP:

**J4EM1105C**

NO.	NAME	STUDENT ID
1.	SYED HUD ALHABSHI BIN SYED ZAIN	2017249506
2.	NIK NUR KHALEEDA BINTI NIK NORZAINAL ABIDIN	2017246724
3.	ADRIANA MARLISA BINTI FAZNEEHISHAM	2017249654
4.	AMIR YUSUF BIN MOHD SYUKRI	2016298318

## **ACKNOWLEDGEMENT**

First of all, we would like to thank Allah SWT for giving us greatest health and ease our journey on completing our project which is Automated Knife Sharpener.

Also, we would like to express our gratitude to our supervisor, Madam Mazleenda Binti Mazni for giving us her full support and attention to help and us completing this project by guiding us about many things in order to make this project a success and also for keep on encouraging us through out this project.

Secondly, special thanks and a huge congratulation to all team members of this group for their good cooperation and team work during this project progression. Because of that great cooperation, we were able to finish our project on time although we had some difficult times.

Also, we were very thankful for our lecturer, Sir Firdaus Bin Sukarman for giving us the knowledge regarding what is needed for our project and our classmates for giving their support mentally and physically to help us completing this project and also to all assistant engineers in the workshop that guides us and giving us useful information and also non stop encouragement.

Finally, we would like to thank our parents for giving us tremendous support for us to complete this project. They helps us by providing us with necessary financial for us to buy the things needed for ourproject and also for spending some time answering a survey that we made regarding this project.

## **ABSTRACT**

Before semi automated knife sharpener were invented, people will use a grinder stone to sharpen their knife. Despite the rise of semi automated knife sharpener, people still use the grinder stone to sharpen their knife because it does not cost much, no use of electricity and the size is small. Some of the notable issues that occurred when using the semi automated knife sharpener is people still has to hold the knife when sharpening which can numb their hand if it takes a long time. Based on the issue, we came up with an idea called Automated Knife Sharpener. Automated Knife Sharpener consist of stainless steel grinder that can sharpen the knife at a short time and it also has a clip that will secure the knife when sharpening the knife. Hence people does not have to hold the knife when sharpening. This shows that this machine is save to be use because everything will be done by the machine and does nit require human energy. Unlike the semi automated knife sharpener, this machine has a water spray when sharpening the knife. This helps the process of sharpening the knife to be more smooth and easier. Other than that, the machine has an LED lights which indicates that the machine is operated when red light is on and the process of sharpening is done when green light is on. This allow the user to do some other house chores while waiting for their knife to be sharpen. Last but not least, this product has the potential to grow and be commercialized as it gives an alternative way and solution to solve problems occurred in this era when sharpening the knife.

## TABLE OF CONTENT

NO.	TITLE	PAGE
1.	<b>CHAPTER 1: INTRODUCTION</b>	1
	<b>1.1</b> Problem Statement	1
	<b>1.2</b> Objective	2
	<b>1.3</b> Significance of the Project	2
	<b>1.4</b> Project Management	3
2.	<b>CHAPTER 2: DESIGN PROBLEM DEFINITION</b>	4
	<b>2.1</b> Market Analysis	4
	2.1.1 Targeted Market and Estimation of Market Size	4
	2.1.2 Customer Needs and Identification	5
	<b>2.2</b> Competitive Benchmarking Product	6
	<b>2.3</b> Final Product Design Specification	7
3.	<b>CHAPTER 3: CONCEPT GENERATION AND SELECTION</b>	8
	<b>3.1</b> Feasible Concepts	8
	<b>3.2</b> Morphological Analysis	8
	3.2.1 Concept 1	10
	3.2.2 Concept 2	11
	3.2.3 Concept 3	12
	3.2.4 Concept 4	13
	3.2.5 Concept 5	14
	<b>3.3</b> Selection of Final Concept	15
	3.3.1 Pugh Chart Analysis	16
4.	<b>CHAPTER 4: EMBODIMENT DESIGN</b>	17
	<b>4.1</b> Product Architecture	17
	<b>4.2</b> Configuration Design	18
	4.2.1 List of Parts	18
	4.2.2 Details Standard Part Selection	19
	<b>4.3</b> Parametric Design	23

5.	<b>CHAPTER 5: DETAIL DESIGN</b>	25
	<b>5.1 Engineering Drawing Set</b>	25
	5.1.1 Detail Drawing of Manufactured Parts	25
	5.1.2 Assembly Drawing	34
	5.1.3 Exploded Drawing	35
	5.1.4 Bill of Material	36
	<b>5.2 Costing Evaluation</b>	37
	5.2.1 Break Even Analysis	37
6.	<b>CHAPTER 6: PROTOTYPING AND TESTING</b>	39
	<b>6.1 Fabrication Process</b>	39
	<b>6.2 Testing of Design: Theoretical Calculation and Simulations</b>	42
	<b>6.3 Result and Discussions</b>	
7.	<b>CHAPTER 7: CONCLUSION AND RECOMMENDATION</b>	45
	<b>7.1 Conclusion on Designed Product</b>	45
	<b>7.2 Future Work</b>	46
8.	<b>REFERENCES</b>	47