

**EM110 DIPLOMA OF MECHANICAL ENGINEERING  
FAKULTI KEJURUTERAAN MEKANIKAL  
UiTM CAWANGAN JOHOR, KAMPUS PASIR GUDANG**

**MEC332 MECHANICAL ENGINEERING DESIGN**

**PROJECT: MINI PROJECT (SMART AUTOMATIC CAT FEEDER)**

**SUPERVISOR'S NAME: SIR AHMAD NAUFAL BIN ADNAN**

**LECTURER'S NAME: DR ABDUL AZIZ BIN YUSOF**

**GROUP: J4EM1105D**

<b>NO.</b>	<b>NAME</b>	<b>STUDENT ID</b>
1	MUHAMMAD AIMAN BIN IBRAHIM	2017220542
2	MUHAMAD AMIRUDDIN BIN NORHISYAM	2017249692
3	MUHAMMAD FAIZ NURHAKIM BIN ABD RAZAK	2017253866
4	NASRUL AZIM BIN HAMIDI	2017227978

## **ACKNOWLEDGEMENT**

We would like to express our sincere gratitude to people during our Final Year Project who have assisted our team. We are grateful for the continued support and encouragement from my peers on this Final Year Project to our group, from initial advice to the last piece of project specifications.

Special thanks to all this group's team members for their outstanding support and creative ideas and thoughts to achieve this task. This project encouraged us to work as a team to ensure the project's progress. This value of teamwork, collaboration, and patience has helped us build positive personality and character.

We have also developed technological and practical skills in line with the aim of this Final Year Project. We would also like to express our gratitude to all those who have supported our group, directly or indirectly.

We are also grateful to Universiti Teknologi MARA Cawangan Johor Kampus Pasir Gudang's assistant engineers of the Faculty of Mechanical Engineering for providing us with technical support to carry out the project work. Also, let us use all of the Institute's required facilities throughout the work of the project without any worries.

## **ABSTRACT**

Our product, a smart automatic cat feeder helps to ensure that all the cats were given enough food and water. This machine mechanism is designed to automatically serves food and water to the cats when it is the time without having the user to push any button on it. After going through response from the survey, we have found that our customers getting tired of feeding their cats manually. They also too busy to feed their cats and sometimes they have to leave their cats for several days to go on holiday. Therefore, we make this machine to help our customers by making timer to this machine. Also, we add a signal indicator for food container and water container so that the owners don't need to check regularly the quantity of water and food left in the container. We also make it portable by using wheel with brake to this machine. Our product is built so that our customers don't have to worry anymore about their cats getting enough food and water and doesn't need to feed them manually because this machine operates automatically.

Introduction.....	5
1.1 Problem Statement.....	5
1.2 Objective.....	5
1.3 Significance of the Project .....	6
2.1 MARKET ANALYSIS.....	7
2.1.1 TARGETED MARKET AND ESTIMATION OF MARKET SIZE .....	10
2.1.2 CUSTOMER NEED AND REQUIREMENT .....	10
2.2 BENCHMARKING PRODUCT .....	11
2.3 FINAL PRODUCT DESIGN SPECIFICATION.....	11
2.3.1 FINAL PRODUCT .....	11
2.3.2 PART WITH SPECIFICATIONS.....	12
2.3.3 PART WITH DESCRIPTIONS .....	13
2.4 PLANNING THE DESIGN PROCESS.....	14
2.4.1 TEAM BEHAVIOR.....	14
2.4.2 TOOLS .....	15
2.4.3 WORK AND MANAGEMENT.....	16
CHAPTER 3: CONCEPT GENERATION AND SELECTION.....	18
3.1 FEASIBLE CONCEPTS .....	18
3.1.1 ESTABLISHED DESIRED DESIGN FUNCTION.....	18
3.1.2 GENERATE CONCEPTUAL DESIGN ALTERNATIVE.....	19
3.1.3 GENERATE DESIGN FROM MORPHOLOGICAL CHART.....	20
3.2 PUGH METHOD FOR EVALUATION .....	25
CHAPTER 4: EMBODIMENT DESIGN.....	27
4.1 PRODUCT ARCHITECTURE.....	27
4.1.2 CONFIGURATION DESIGN .....	30
CHAPTER 5: DETAIL DESIGN.....	31
5.1 Engineering Drawing Set.....	31
5.1.1 Engineering Drawing of Components and Parts.....	31
5.1.2 Assembly Drawings.....	41
5.1.3 Exploded Drawings .....	42
5.2 Bill of Material and Costing.....	43
CHAPTER 6: PROTOTYPING AND TESTING .....	44
6.1 Fabrication of Prototype.....	44
6.2 Testing of Design: Mathematical Models, Simulation and Prototype .....	45
6.2.1 Mathematical Model .....	45
6.2.2 Stress Simulation .....	46

CHAPTER 7: CONCLUSION AND RECOMMENDATION .....	47
7.1 Conclusions on Designed Product .....	47
7.2 Future Works .....	47
CHAPTER 8: REFLECTION ON THE DESIGN PROCESS .....	48
8.1 Strength .....	48
8.2 Weakness.....	48
REFERENCES.....	49
APPENDICES	50