

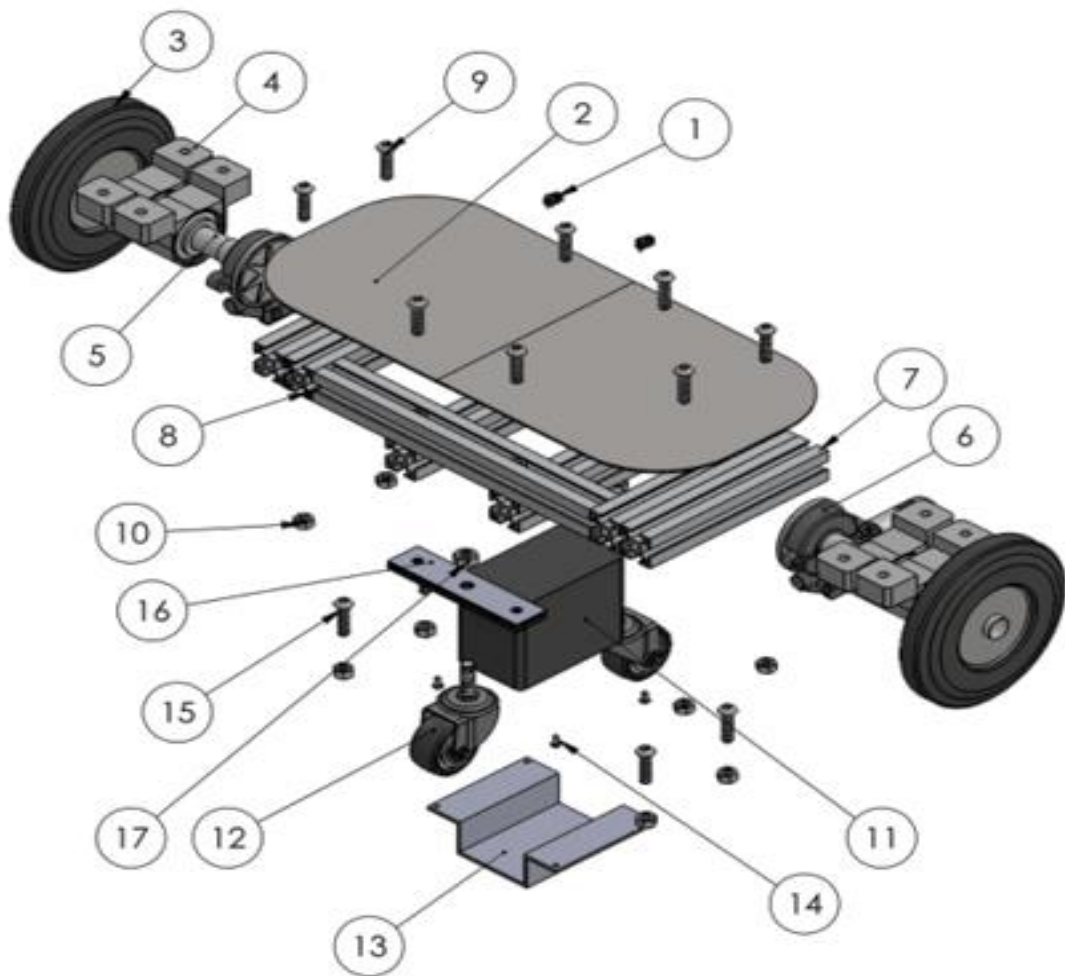
PROTOTYPE DESIGN COLLECTION

SERIES 2



Prototype Design Collection

Series 2



AHMAD NAJMIE RUSLI

**UNIVERSITI TEKNOLOGI MARA CAWANGAN JOHOR
KAMPUS PASIR GUDANG**

Copyright © 2023 Prototype Design Collection Series 2.

All right reserved. No part of this digital book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without written permission from the Head of Centre of Mechanical Engineering Studies, (Pusat Pengajian Kejuruteraan Mekanikal), College of Engineering, Universiti Teknologi MARA Johor Branch, Pasir Gudang Campus.

e-ISBN NO 978-967-0033-18-1

First published, 29th September 2023

CHIEF EDITOR:

Ahmad Najmie Rusli

CONTENT EDITORS:

Ahmad Faidzal Khodori

Hazriel Faizal Pahroraji

Norhisyam Jenal

Nurrul Amilin Zainal Abidin

Nurulnatisya Ahmad

Radzi Abdul Rasih

PUBLISHED BY:

Universiti Teknologi MARA Cawangan Johor,

Kampus Pasir Gudang,

Jalan Purnama, Bandar Seri Alam,

81750 Masai,

Johor Darul Ta'zim.

Tel: +60 7-381 8493

FOREWORD

This digital book on Prototype Design Collection Series 2 (PDC Series 2) is published as a reference design for mechanical engineering students. The designs presented experience a few phases of analysis before fabrication of prototype. Each project summarises the project description, prototype, figures, and design parameter. The design products vary in tools or equipment for household, workshop, entrepreneur, etc. Suggested material and detail of prototype dimension are also mentioned in this book.

It is hoped that this book will assist the students to have more ideas on innovation design products in the future.

Table of Contents

| | |
|---|----|
| CHAPTER 1 | 1 |
| An Improvement of Storage Space and Drying Using Shoe Dryer Cabinet | 1 |
| Muhammad Arif Imran Bin Iskandar ¹ and Miqdad Bin Khairulmaini ^{2*} | 1 |
| CHAPTER 2 | 3 |
| Portable Wrapping Machine | 3 |
| Muhammad Hakim Bin Hisam ¹ and Miqdad Bin Khairulmaini ^{2*} | 3 |
| CHAPTER 3 | 5 |
| Design and Fabrication of Innovative Egg Breaker and Egg Yolk Separator Machine | 5 |
| Muhammad Fathurrahman Bin Muizzuddin ¹ and Miqdad Bin Khairulmaini ^{2*} | 5 |
| CHAPTER 4 | 7 |
| Development of Innovative Portable Washing Machine | 7 |
| Anna Jasmine Binti Hariulnizam ¹ and Miqdad Bin Khairulmaini ^{2*} | 7 |
| CHAPTER 5 | 9 |
| Development of a Prototype Mechanically Moveable and Height-Adjustable Ladder | 9 |
| Muhammad Aiman Bin Mat Nawi ¹ and Miqdad Bin Khairulmaini ^{2*} | 9 |
| CHAPTER 6 | 11 |
| Design and Fabrication of Mechanical Floor Cleaner | 11 |
| Muhamad Arif Bin Jailan ¹ and Miqdad Bin Khairulmaini ^{2*} | 11 |
| CHAPTER 7 | 13 |
| Design and Fabricate of Portable and Multifunction Shoe Rack | 13 |
| Farez Azra'e Bin Arman ¹ and Radzi Abdul Rasih ^{2*} | 13 |
| CHAPTER 8 | 15 |
| Food Manual Grinder | 15 |
| Nur Izzah Putri Binti Shamsul Niza ¹ and Ab Aziz Mohd Yusof ^{2*} | 15 |
| CHAPTER 9 | 17 |
| Design, Analysis and Fabrication of Loose Oil Palm Fruit Picker | 17 |
| Ahmad Amin Zakwan Bin Abu Mawan ¹ and Norjasween Abdul Malik ^{2*} | 17 |
| CHAPTER 10 | 19 |
| Development Of a Prototype Automatic Sauce Dispenser | 19 |
| Asif Muhaimin Mohd Saiful Nizam ¹ and Norjasween Abdul Malik ^{2*} | 19 |
| CHAPTER 11 | 21 |
| Design, Analysis and Fabrication of Dustbin 5R | 21 |
| Faiqah Nadhirah Binti Zaizul Jifri ¹ and Norjasween Abdul Malik ^{2*} | 21 |

| | |
|---|----|
| CHAPTER 12 | 23 |
| Design, Fabrication and Analysis of Apam Balik Cooker | 23 |
| Muhammad Afiq Danial bin Ramlee ¹ and Hazriel Faizal bin Pahroraji ^{2*} | 23 |
| CHAPTER 13 | 25 |
| Design, Fabricate and Analysis of Semi Auto Tart Printer Machines | 25 |
| Muhammad Haziq bin Md Fauzi ¹ and Hazriel Faizal bin Pahroraji ^{2*} | 25 |
| CHAPTER 14 | 27 |
| Fish Scaling Machines | 27 |
| Adam bin Habri ¹ and Haszeme bin Abu Kasim ^{2*} | 27 |
| CHAPTER 15 | 29 |
| Yard Cleaner | 29 |
| Aiman Haziq bin Ahmad Hashni ¹ and Haszeme bin Abu Kasim ^{2*} | 29 |
| CHAPTER 16 | 31 |
| Advanced Food Folder Machine | 31 |
| Alya binti Amenudden ¹ and Haszeme bin Abu Kasim ^{2*} | 31 |
| CHAPTER 17 | 33 |
| The Oil Palm Loose Fruit Collector Machine | 33 |
| Zulhusni Bin Samsor ¹ and Haszeme bin Abu Kasim ^{2*} | 33 |
| CHAPTER 18 | 35 |
| An Automatic Rempeyek Machine | 35 |
| Siti Nur Aina Khadijah binti Mohd Noh ¹ and Siti Khadijah binti Alias ^{2*} | 35 |
| CHAPTER 19 | 37 |
| Safety Cooking Gas Trolley | 37 |
| Hazim Aizzuddin bin Azizzan ¹ and Ahmad Faizal bin Khodori ^{2*} | 37 |
| CHAPTER 20 | 39 |
| Waste Compactor Trash Can | 39 |
| Wan Syafiq Nadzmie bin Wan Suhaimi ¹ and Ahmad Faizal bin Khodori ^{2*} | 39 |
| CHAPTER 21 | 41 |
| Hydrogen Flame Generator from Water | 41 |
| Muhammad Hizami Bin Rahman ¹ , Nurulnatisya Binti Ahmad ^{2*} and Muhammad Amir Bin Md Shah ³ | 41 |
| CHAPTER 22 | 43 |
| Semi-Automatic Collecting Load Trolley | 43 |
| Muhammad Luqman Bin Mohd Suhardi ¹ and Nurulnatisya Binti Ahmad ^{2*} | 43 |
| CHAPTER 23 | 45 |
| A Garden Storage Trolley with Dried Leaves & Trash Collector | 45 |

| | |
|---|----|
| Muhamad Hasan Mohd Juzaila ¹ , Najibah Ab Latif ^{2*} and Ainaa Maya Munira Ismail ³ | 45 |
| CHAPTER 24 | 47 |
| Design and Fabrication of Shoe Rack with Dryer Function | 47 |
| Mohamad Syafie Bin Zainal ¹ , Nur Kamarliah Kamardin ^{2*} and Ahmad Idzwan Yusuf ³ | 47 |
| CHAPTER 25 | 49 |
| Dustbin Lid Pedal Lifter | 49 |
| Luqman Haikal Bin Zulhelmi ¹ , Nur Kamarliah Kamardin ^{2*} and Ahmad Idzwan Yusuf ³ | 49 |
| CHAPTER 26 | 51 |
| Designed, Analyzed and Fabricated of Mechanical Trolley Stair Climber | 51 |
| Muhamad Husain bin Mohd Juzaila ¹ , Nur Kamarliah Kamardin ^{2*} and Ahmad Idzwan Yusuf ³ ... | 51 |
| CHAPTER 27 | 53 |
| Design and Fabrication of Crushing Machine | 53 |
| Mohamad Amirul Afieq Danial Bin Azlan ¹ and Ahmad Najmie Rusli ^{2*} | 53 |
| CHAPTER 28 | 55 |
| Design, Analysis and Fabrication Coconut Flakes Scrapping Machine | 55 |
| Amir Aziq Ab Hamid ¹ and Ahmad Najmie Rusli ^{2*} | 55 |
| CHAPTER 29 | 57 |
| Hand Operated Can Crusher | 57 |
| Muhammad Ammar bin Che Suffian ¹ and Suhadiyana binti Hanapi ^{2*} | 57 |
| CHAPTER 30 | 59 |
| Portable Drill Press Machine | 59 |
| Nurul Afiqah Binti Abu Bakri ¹ and Suhadiyana binti Hanapi ^{2*} | 59 |
| CHAPTER 31 | 61 |
| Design and Fabrication of 3 in 1 Foldable Hand Trolley | 61 |
| Amir Hassan bin Shamsul Ezam ¹ and Hazriel Faizal bin Pahroraji ^{2*} | 61 |
| CHAPTER 32 | 63 |
| Design and Fabrication of The Semi-Automated Clothes Wringer | 63 |
| Muaz Azimuddin bin Afifudden ¹ and Hazriel Faizal bin Pahroraji ^{2*} | 63 |
| CHAPTER 33 | 65 |
| Design and Fabrication of Automatic Flour Filter | 65 |
| Muhammad Aqil Fahmy Bin Reduan ¹ and Hazriel Faizal bin Pahroraji ^{2*} | 65 |
| CHAPTER 34 | 67 |
| Design and Fabrication of Road Footpath Cleaner Machine | 67 |
| Abdul Fattah Zuhair bin Zukri ¹ and Haszeme bin Abu Kasim ^{2*} | 67 |
| CHAPTER 35 | 69 |
| Mechanical Pathway Cleaner | 69 |

| | |
|--|----|
| Ahmad Adham Irfan bin Nasrullah ¹ and Haszeme bin Abu Kasim ^{2*} | 69 |
| CHAPTER 36 | 71 |
| Design and Fabrication of a Consistent Knife Sharpener | 71 |
| Nik Rafiuddin Rizki bin Abd Razak ¹ and Haszeme bin Abu Kasim ^{2*} | 71 |
| CHAPTER 37 | 73 |
| Wrapping Device | 73 |
| Ayuni Faridah Zaid ¹ , Mohd Noor Halmy Ab Latif ^{2*} and Norshadila Ahmad Badela ³ | 73 |
| CHAPTER 38 | 75 |
| Design and Fabrication of Height Adjustable Study Table | 75 |
| Irfan Yusuf Mohd Riduan ¹ , Mohd Noor Halmy Ab Latif ^{2*} and Norshadila Ahmad Badela ³ | 75 |
| CHAPTER 39 | 77 |
| Design and Fabrication of Height Adjustable Study Table | 77 |
| Haikal Hakimi ¹ and Nurulsaidatulsyida Sulong ^{2*} | 77 |
| CHAPTER 40 | 79 |
| Design and Fabrication of Automated Mini Forklift | 79 |
| Fatin Nabila Mohd Zaki ¹ , Nur Kamarliah Kamardin ^{2*} and Ahmad Idzwan Yusuf ³ | 79 |
| CHAPTER 41 | 81 |
| Design and Fabrication of Coconut Slicer Machine | 81 |
| Abdul Muhaimin Bin Abd Karim ¹ and Ahmad Najmie Rusli ^{2*} | 81 |
| CHAPTER 42 | 83 |
| Design and Fabrication of Motorised Sieving Machine | 83 |
| Mohammad Hariz Azmi ¹ and Ahmad Najmie Rusli ^{2*} | 83 |
| CHAPTER 43 | 85 |
| Pineapple Tart Mould Machine | 85 |
| Aini Shaylineka Ab Razak ¹ and Ahmad Najmie Rusli ^{2*} | 85 |
| CHAPTER 44 | 87 |
| Design and Fabrication of Manual Mini Scooter | 87 |
| Nuradilah Syafiqah Abdul Razak ¹ and Ahmad Najmie Rusli ^{2*} | 87 |
| CHAPTER 45 | 89 |
| Design and Fabrication of Garden Storage Tool Cart | 89 |
| Muhammad Akmal Syahmi Bin Sazaleigh ¹ , Najibah Ab Latif ^{2*} and Ainaa Maya Munira Ismail ³ .. | 89 |
| CHAPTER 46 | 91 |
| Tri-Wheel Trolley with Adjustable Holder | 91 |
| Muhammad Ekhwan Farhan Edzrizar ¹ and Abdul Hadi Abdul Rahim @ Ibrahim ^{2*} | 91 |
| CHAPTER 47 | 93 |
| Development of a Prototype Pet Litter Sand Filtering Machine | 93 |

| | |
|---|-----|
| Muhammad Haziq Haikal Adli Rahimi ¹ and Norhisyam Jenal ^{2*} | 93 |
| CHAPTER 48 | 95 |
| Development of a Bamboo Hollower Mechanism | 95 |
| Muhammad Arsyad Anuar ¹ and Norhisyam Jenal ^{2*} | 95 |
| CHAPTER 49 | 97 |
| Development of a Prototype Vegetable and Fruit Semi-Automatic Slicer Machine | 97 |
| Muhammad Aimanfikri Md Rizal ¹ and Norhisyam Jenal ^{2*} | 97 |
| CHAPTER 50 | 99 |
| Design and Fabrication of An Automatic Flour Sieve Machine | 99 |
| Muhamad Aris Iskandar Mazlan ¹ and Norhisyam Jenal ^{2*} | 99 |
| CHAPTER 51 | 101 |
| Conceptual Automatic Rempeyek Making Machine | 101 |
| Ahmad Nor Aafif bin Saharrudin ¹ and Siti Khadijah binti Alias ^{2*} | 101 |
| CHAPTER 52 | 103 |
| Sliding Grinder Table | 103 |
| Syazwan Naim bin Sahillah ¹ and Siti Khadijah binti Alias ^{2*} | 103 |
| CHAPTER 53 | 105 |
| Portable Fresh Coconut Milk Extractor for Small and Medium Industries (SMI) | 105 |
| Ahmad Syahmi Bin Yusneta ¹ , Ab Aziz Mohd Yusof ^{2*} and Kamariah Md Isa ³ | 105 |
| CHAPTER 54 | 107 |
| Rubber Tapping Machine for Plantation Industry | 107 |
| Ahmad Syakir Bin Abdul Rahim ¹ , Ab Aziz Mohd Yusof ^{2*} and Kamariah Md Isa ³ | 107 |
| CHAPTER 55 | 109 |
| Development of a Hoverboard | 109 |
| Siti Rafhanah Suwandi ¹ and Mohd Fadzli Ismail ^{2*} | 109 |
| CHAPTER 56 | 111 |
| Coconut and Durian Skin Peelers Machine | 111 |
| Akmal Danial Bin Mohd Asri ¹ and Norjasween Abdul Malik ^{2*} | 111 |
| CHAPTER 57 | 113 |
| Automatic Cat Feeder | 113 |
| Nur Fatihah Binti Mohd Zainuddin ¹ and Norjasween Abdul Malik ^{2*} | 113 |
| CHAPTER 58 | 115 |
| Monoshock Compressor | 115 |
| Othman Al Affan Abd Rashid ¹ and Norjasween Abdul Malik ^{2*} | 115 |
| CHAPTER 59 | 117 |
| Automatic Drain Rubbish Collector | 117 |

| | |
|---|-----|
| Muhammad Farhan Bin Azlan ¹ and Azizul Hakim Bin Samsudin ^{2*} | 117 |
| CHAPTER 60 | 119 |
| Drone Rigs for Farmers | 119 |
| Muhammad Irham Haikal Bin Mohamad Rashid ¹ and Azizul Hakim Bin Samsudin ^{2*} | 119 |
| CHAPTER 61 | 121 |
| Design And Fabrication of Dough Roller Machine | 121 |
| Muhammad Haziq Bin Mohd Zahir ¹ and Miqdad Bin Khairulmaini ^{2*} | 121 |
| CHAPTER 62 | 123 |
| Design and Fabrication of Smart Box Conceal for Letter and Parcel | 123 |
| Muhammad Harraz Hazim Bin Noor Azhar ¹ and Zeno Michael ^{2*} | 123 |
| CHAPTER 63 | 125 |
| Development of A Prototype Kitchen Cutting Equipment | 125 |
| Mukhriz Bin Azizi ¹ and Zeno Michael ^{2*} | 125 |
| CHAPTER 64 | 127 |
| Design and Fabrication of Multifunction Laptop Cooler | 127 |
| Nadzirul Azizi Bin Norizam ¹ and Zeno Michael ^{2*} | 127 |
| CHAPTER 65 | 129 |
| Design and Fabrication of Iron Board | 129 |
| Faris Danial bin Fairuz ¹ and Radzi Abdul Rasih ^{2*} | 129 |
| CHAPTER 66 | 131 |
| Multifunction Cooler Box for Indoor and Outdoor Usage Application | 131 |
| Hanis Nabilah binti Khairul Nizam ¹ and Radzi Abdul Rasih ^{2*} | 131 |
| CHAPTER 67 | 133 |
| Design and Fabrication of Automatic Can Crusher | 133 |
| Muqri Azfar bin Mohd Faizar ¹ and Radzi Abdul Rasih ^{2*} | 133 |
| CHAPTER 68 | 135 |
| Automated Adjustable Portable Grill | 135 |
| Aiman Danial Bin Asrul Effendi ¹ and Ahmad Faidzal bin Khodori ^{2*} | 135 |
| CHAPTER 69 | 137 |
| Manually Operated Floor Cleaning Machine | 137 |
| Muhammad Afiq bin Muhamad Nazar ¹ and Ahmad Faidzal bin Khodori ^{2*} | 137 |
| CHAPTER 70 | 139 |
| Design and Fabrication of a Self-Balancing Device for Food Delivery | 139 |
| Alif Darwisy Mohd Fauzi ¹ , Nur Kamarliah Kamardin ^{2*} and Ahmad Idzwan Yusuf ³ | 139 |
| CHAPTER 71 | 141 |
| Sand Sieve Machine | 141 |

| | |
|---|-----|
| Danish Farhan Mohd Faizal ¹ , Nur Kamarliah Kamardin ^{2*} and Ahmad Idzwan Yusuf ³ | 141 |
| CHAPTER 72 | 143 |
| Design and Fabrication of Agricultural Sprayer | 143 |
| Muhammad Al-Hadi Rusli ¹ , Nur Kamarliah Kamardin ^{2*} and Ahmad Idzwan Yusuf ³ | 143 |
| CHAPTER 73 | 145 |
| Design and Fabrication of Coconut Milk Extractor Machine | 145 |
| Haris Luqman Saipulnizam ¹ and Ahmad Najmie Rusli ^{2*} | 145 |
| CHAPTER 74 | 147 |
| Texture Dough Machine | 147 |
| Muhammad Afiq Amsyar Bin Mohamad Yusri ¹ and Ahmad Najmie Rusli ^{2*} | 147 |
| CHAPTER 75 | 149 |
| Mini Injection Molding Machine | 149 |
| Dayangku Dalalin Amirah Awang Horolni ¹ and Ahmad Najmie Rusli ^{2*} | 149 |
| CHAPTER 76 | 151 |
| Combined Soil Preparation Machine of Plowing and Crop Boundaries for Smallholder Agriculture | 151 |
| Lutfil Hadi Bin Suhaimie ¹ , Ab Aziz Mohd Yusof ^{2*} and Kamariah Md Isa ³ | 151 |
| CHAPTER 77 | 153 |
| Design and Fabrication of Automatic Recycle Bin | 153 |
| Muhammad Iqbal Wafiuddin Johar ¹ and Raja Muhammad Aslam Raja Arif ^{2*} | 153 |
| CHAPTER 78 | 155 |
| Development of A Silent Air Purifier and Humidifier Using Water Filter | 155 |
| Mohamed Fariz Nazmie Mohamed Fauzi ¹ and Raja Muhammad Aslam Raja Arif ^{2*} | 155 |
| CHAPTER 79 | 157 |
| Design and Fabrication of 2-in-1 Gardening Tools | 157 |
| Muhammad Ilhan Harith Mohd Faizul ¹ and Raja Muhammad Aslam Raja Arif ^{2*} | 157 |
| CHAPTER 80 | 159 |
| Design and Fabrication of Multipurpose Agriculture Machine | 159 |
| Muhammad Muhaimin Haiqal Rozee ¹ and Raja Muhammad Aslam Raja Arif ^{2*} | 159 |
| CHAPTER 81 | 161 |
| Design and Innovation of The Beach Cleaner | 161 |
| Mohamad Amirul Danial Zulkifli ¹ and Abdul Hadi Abdul Rahim @ Ibrahim ^{2*} | 161 |
| CHAPTER 82 | 163 |
| Design and Fabrication of Hydro Fruit Picker | 163 |
| Muhammad Ammar Hamizan Zolkeplee ¹ and Abdul Hadi Abdul Rahim @ Ibrahim ^{2*} | 163 |
| CHAPTER 83 | 165 |

| | |
|--|-----|
| Design and Fabrication of Automatic Foodstuff Cutter | 165 |
| Muhammad Afiq Aiman Amat Norizam ¹ and Abdul Hadi Abdul Rahim @ Ibrahim ^{2*} | 165 |
| CHAPTER 84 | 167 |
| Automatic Seed Sowing Machine | 167 |
| Mohammad Danish Hakim Kasim ¹ and Abdul Hadi Abdul Rahim @ Ibrahim ^{2*} | 167 |
| CHAPTER 85 | 169 |
| Intelligent Compress Bin | 169 |
| Muhammad Nabil Nazmi Mohd Nadzir ¹ and Abdul Hadi Abdul Rahim @ Ibrahim ^{2*} | 169 |
| CHAPTER 86 | 171 |
| Design and Fabrication of Mechanical Sand Purifier | 171 |
| Ahmad Aiman Suhaimi ¹ and Muhamad Faris Syafiq Khalid ^{2*} | 171 |
| CHAPTER 87 | 173 |
| Design and Fabrication of Portable Solar Cooker | 173 |
| Intanku Sofea Mohamad Zaidi ¹ and Muhamad Faris Syafiq Khalid ^{2*} | 173 |
| CHAPTER 88 | 175 |
| Design and Fabrication of Coins Separator Machine | 175 |
| Nur Dania Irdeena Astapa Kamal ¹ and Muhamad Faris Syafiq Khalid ^{2*} | 175 |
| CHAPTER 89 | 177 |
| Design and Fabrication of Automatic Sweeper | 177 |
| Khairul Fikri Mohd Khairi ¹ and Norhisyam Jenal ^{2*} | 177 |
| CHAPTER 90 | 179 |
| Design and Fabrication of Automatic Thermoforming Plastic Machine | 179 |
| Amerul Aiezed bin Azhari ¹ and Siti Khadijah binti Alias ^{2*} | 179 |
| CHAPTER 91 | 181 |
| Sliding Grinder Table | 181 |
| Muhammad Safwan Haziq Bin Harif Fadzilla ¹ and Siti Khadijah binti Alias ^{2*} | 181 |
| CHAPTER 92 | 183 |
| Automatic Whiteboard Cleaner | 183 |
| Haziq Syakir bin Ismail ¹ and Hazriel Faizal bin Pahroraji ^{2*} | 183 |
| CHAPTER 93 | 185 |
| Design and Fabrication of Hydraulic Pipe Bending Machine | 185 |
| Mohamad Asyraf Bin Zainal ¹ and Hazriel Faizal bin Pahroraji ^{2*} | 185 |
| CHAPTER 94 | 187 |
| Automated Wrapping Machine | 187 |
| Ammar Arham ¹ , Azulaifiz Fauzan Aznam ² , Mohd Noor Halmy Ab Latif ^{3*} and Norshadila Ahmad Badela ⁴ | 187 |

| | |
|--|-----|
| CHAPTER 95 | 189 |
| Design and Fabrication of Double Automatic Can Crusher | 189 |
| Adib Farhan bin Badrol Isa ¹ and Nurul Hanna binti Mas'aud ^{2*} | 189 |
| CHAPTER 96 | 191 |
| Ergonomic Height Adjustable Desk | 191 |
| Ammar Hakim bin Aidi ¹ and Nurul Hanna binti Mas'aud ^{2*} | 191 |
| CHAPTER 97 | 193 |
| Fish Cake Forming Machine | 193 |
| Hana Binti Razali ¹ and Nurul Hanna binti Mas'aud ^{2*} | 193 |
| CHAPTER 98 | 195 |
| Design and Fabrication of Motorized Food Packer | 195 |
| Muhammad Haziq Irfan Bin Yusrizam ¹ and Nurulsaidatulsyida Sulong ^{2*} | 195 |
| CHAPTER 99 | 197 |
| Design and Fabrication of Rice Washing Machine | 197 |
| Muhammad Luqman Arif Bin Mohd Azmi ¹ and Nurulsaidatulsyida Sulong ^{2*} | 197 |
| CHAPTER 100 | 199 |
| Automatic Motorbike Side Stand | 199 |
| Muhammad Amir bin Roslan ¹ and Suhadiyana binti Hanapi ^{2*} | 199 |
| CHAPTER 101 | 201 |
| Coconut Automatic Machine Grinder | 201 |
| Nadiatul Aiman Binti Abd. Hamid ¹ and Azizul Hakim Bin Samsudin ^{2*} | 201 |
| CHAPTER 102 | 203 |
| Automatic Spinning Underclothing Hanger | 203 |
| Muhammad Haikal Haziq Bin Abdul Razak ¹ and Nur Aini Sabrin Manssor ^{2*} | 203 |
| CHAPTER 103 | 205 |
| Development of a Prototype Motion Sensor Mini Candy Dispenser | 205 |
| Muhammad Luqman Bin Khusairi ¹ and Nur Aini Sabrin Manssor ^{2*} | 205 |
| CHAPTER 104 | 207 |
| Design and Fabrication of Vegetables Dicer | 207 |
| Muhammad Luqman bin Nasaruddin ¹ and Zeno Michael ^{2*} | 207 |
| CHAPTER 105 | 209 |
| Agricultural Sprayer Machine | 209 |
| Amir Hakim bin Azmi ¹ and Ahmad Faidzal bin Khodori ^{2*} | 209 |
| CHAPTER 106 | 211 |
| Automatic Sand Sieve | 211 |
| Adam Afiq bin Khairulfaizal ¹ and Ahmad Faidzal bin Khodori ^{2*} | 211 |

| | |
|--|-----|
| CHAPTER 107 | 213 |
| Design and Fabrication of Agriculture Wheel Pump | 213 |
| Muhammad Hakimi Bin Hamsah ¹ and Nurulnatisya Binti Ahmad ^{2*} | 213 |
| CHAPTER 108 | 215 |
| Design and Fabrication of Agriculture Multi Sprayer | 215 |
| Nabil Najwan Bin Salehudin Alayob ¹ and Syidatul Akma Sulaiman ^{2*} | 215 |
| CHAPTER 109 | 217 |
| Design and Fabrication of Ecofriendly Sweeper | 217 |
| Siti Nur Faqiha Binti Mohd Yasin ¹ and Syidatul Akma Sulaiman ^{2*} | 217 |
| CHAPTER 110 | 219 |
| Design and Fabrication of 4 Way Nut Remover | 219 |
| Muhammad Irfanhaikal Bin Ikhmal Albakri ¹ and Syidatul Akma Sulaiman ^{2*} | 219 |
| CHAPTER 111 | 221 |
| Development and Designing a Folding Bicycle Stand | 221 |
| Raja Imran Hakimi Bin Raja Ahmad Shukri ¹ and Hazim Sharudin ^{2*} | 221 |
| CHAPTER 112 | 223 |
| Experimental Investigation on The Generation of Electrical Power Using Gymnasium Bicycle | 223 |
| Wan NurMuhammad Bin Wan Mohamed Tarmizi ¹ and Hazim Sharudin ^{2*} | 223 |
| CHAPTER 113 | 225 |
| Design and Fabrication of GPS Bicycle Tracking | 225 |
| Siti Nur Hanisah Binti Noor Azmi ¹ and Hazim Sharudin ^{2*} | 225 |
| CHAPTER 114 | 227 |
| Adjustable Wide Multifunctional Trolley | 227 |
| Muhammad Saiful Aiman bin Mohd Zin ¹ and Ab Aziz Mohd Yusof ^{2*} | 227 |
| CHAPTER 115 | 229 |
| Automatic Knife Sharpener | 229 |
| Mohamad Naqib Bin Norlizan ¹ , Noor Hafiz Noordin ² and Mohd Ghazali Mohd Hamami ^{3*} | 229 |
| CHAPTER 116 | 231 |
| Automatic Flour Sieving Machine | 231 |
| Muhamad Haikal Aiman Bin Mohamad Rashidi ¹ , Noor Hafiz Noordin ² and Mohd Ghazali Mohd Hamami ^{3*} | 231 |
| CHAPTER 117 | 233 |
| Mini Cooling Fridge using Peltier | 233 |
| Muhammad Adam Bin Abdullah ¹ , Noor Hafiz Noordin ² and Mohd Ghazali Mohd Hamami ^{3*} | 233 |
| CHAPTER 118 | 235 |

| | |
|---|-----|
| Beach Cleaning Machine | 235 |
| Muhammad Ashraf Aiman Bin Hairulnizam ¹ , Noor Hafiz Noordin ² and Mohd Ghazali Mohd Hamami ^{3*} | 235 |
| CHAPTER 119 | 237 |
| Mini Conveyor Belt Using Geneva Mechanism | 237 |
| Muhammad Hariz Luqman bin Mohd Huszeine ¹ and Suhadiyana binti Hanapi ^{2*} | 237 |
| CHAPTER 120 | 239 |
| Design and Fabrication of a Mini Dishwasher | 239 |
| Muhammad Zikry Bin Saifullah ¹ and Nur Aini Sabrin Manssor ^{2*} | 239 |
| CHAPTER 121 | 241 |
| Design, Analysis, and Fabrication of An Automatic Wireless Door Lock | 241 |
| Nu'man Shafiq Bin Shahrin ¹ and Zeno Michael ^{2*} | 241 |
| CHAPTER 122 | 243 |
| Innovative Garbage Collector for Small Worker Application | 243 |
| Luqmanul Hakim bin Jamingan ¹ and Radzi Abdul Rasih ^{2*} | 243 |
| CHAPTER 123 | 245 |
| Automatic Watering System for Plants Using Arduino | 245 |
| Syahmi Bin Sarifuddin ¹ and Nurulnatisya Binti Ahmad ^{2*} | 245 |
| Mechanical Design of Automatic Beach Cleaner | 247 |
| Muhammad Qaiyim Almunawwar Bin Ahmad Zawave ¹ and Nurulnatisya Binti Ahmad ^{2*} | 247 |
| CHAPTER 125 | 249 |
| Design and Fabrication of Slicer with Many Blade | 249 |
| Muhammad Nur Falah Bin Mohd Nizafar ¹ and Nurulnatisya Binti Ahmad ^{2*} | 249 |
| CHAPTER 126 | 251 |
| Mini Solar Water Heater | 251 |
| Muhammad Luqman Bin Khairi ¹ and Nurulnatisya Binti Ahmad ^{2*} | 251 |
| CHAPTER 127 | 253 |
| Design and Fabrication of Hydraulic-Assisted Rehabilitation Model | 253 |
| Akif Akmal Bin Shahrol Ismail ¹ and Nurulnatisya Binti Ahmad ^{2*} | 253 |
| CHAPTER 128 | 255 |
| Design and Fabrication of Pressure Jack | 255 |
| Muhammad Saiful Anuar Bin Aminnudin ¹ and Syidatul Akma Sulaiman ^{2*} | 255 |
| CHAPTER 129 | 257 |
| Design and Fabrication of a Multipurpose Trolley | 257 |
| Wan Adam Mirza Wan Jeffry ¹ and Syidatul Akma Sulaiman ^{2*} | 257 |
| CHAPTER 130 | 259 |

| | |
|---|-----|
| Design and Fabrication of an Automated Mini Hacksaw | 259 |
| Muhammad Muqri Aniq Bin Zakaria ¹ and Syidatul Akma Sulaiman ^{2*} | 259 |
| CHAPTER 131 | 261 |
| Design and Fabrication of an Automated Puri and Capati Maker | 261 |
| Muhammad Harraz Luqman Bin Mohd Huszeine ¹ and Syidatul Akma Sulaiman ^{2*} | 261 |
| CHAPTER 132 | 263 |
| Design and Fabrication of Can Presser | 263 |
| Muhammad Haqimie Mohd Nasri ¹ and Raja Muhammad Aslam Raja Arif ^{2*} | 263 |
| CHAPTER 133 | 265 |
| Agriculture Pump Sprayer Trolley | 265 |
| Muhammad Shazril Nazmi Mohd Nizam ¹ and Abdul Hadi Abdul Rahim @ Ibrahim ^{2*} | 265 |
| CHAPTER 134 | 267 |
| Design and Fabrication of An Egg Peeler | 267 |
| Muhammad Ariff Mansor ¹ and Abdul Hadi Abdul Rahim @ Ibrahim ^{2*} | 267 |
| CHAPTER 135 | 269 |
| Design and Fabrication of Automatic Flour Filter and Separator | 269 |
| Muhammad Amir Haziq Mohd Yusri ¹ and Nurrul Amilin Zainal Abidin ^{2*} | 269 |
| CHAPTER 136 | 271 |
| Design and Fabrication of Vegetable Cutting Machine | 271 |
| Muhammad Hakimie Md Mokhtar ¹ and Nurrul Amilin Zainal Abidin ^{2*} | 271 |
| CHAPTER 137 | 273 |
| Design and Fabrication of Flatbread Dough Maker | 273 |
| Muhammad Iskandar bin Ahmad Zulfaqar ¹ and Nurrul Amilin Zainal Abidin ^{2*} | 273 |
| CHAPTER 138 | 275 |
| Loose Fruit Collector and Instant Packaging Machine for Palm Oil Industry | 275 |
| Akmal Lutfi Mohamad ¹ , Kamariah Md Isa ^{2*} and Ab Aziz Mohd Yusof ³ | 275 |
| CHAPTER 139 | 277 |
| Semi Automatic Egg Washer for Egg Production | 277 |
| Alan Kennedy Anak Sylvester Maluh ¹ , Kamariah Md Isa ^{2*} and Ab Aziz Mohd Yusof ³ | 277 |
| CHAPTER 140 | 279 |
| Manually Operated Onions Grading Machine for the Agricultural Product | 279 |
| Intan Nur Mawaddah binti Mohd Sham ¹ , Kamariah Md Isa ^{2*} and Ab Aziz Mohd Yusof ³ | 279 |
| CHAPTER 141 | 281 |
| Development of a Vegetable Slicing Machine | 281 |
| Adil Ariff ¹ and Mohd Fadzli Ismail ^{2*} | 281 |
| CHAPTER 142 | 283 |

| | |
|--|-----|
| Design and Fabrication of Motorized Car Jack | 283 |
| Muhammad Irfan Naqiuddin Talib ¹ and Mohd Fadzli Ismail ^{2*} | 283 |
| CHAPTER 143 | 285 |
| Design and Fabrication of Semi-Automatic Pestle and Mortar Machine | 285 |
| Muhammad Izzat Lukman ¹ and Mohd Fadzli Ismail ^{2*} | 285 |
| CHAPTER 144 | 287 |
| Design and Fabrication of Wet Clothes' Spinning Machine | 287 |
| Nadzirah Huda Ariuddin ¹ and Mohd Fadzli Ismail ^{2*} | 287 |
| CHAPTER 145 | 289 |
| Development of a Clothes Folding Machine | 289 |
| Nur Aliesya Mohamad Saifol ¹ and Mohd Fadzli Ismail ^{2*} | 289 |
| CHAPTER 146 | 291 |
| Development of a Clothes Folding Machine | 291 |
| Azlan Shah Kamarul Kalai ¹ and Nor Liawati Abu Othman ^{2*} | 291 |
| Reference | 293 |

CHAPTER 97

Fish Cake Forming Machine

Hana Binti Razali ¹ and Nurul Hanna binti Mas'aud ^{2*}

^{1,2}*Mechanical Engineering Studies, College of Engineering, Universiti Teknologi MARA
Johor Branch, Pasir Gudang Campus, 81750 Masai, Bandar Seri Alam, Johor Darul Ta'zim.*

**Corresponding author (e-mail): nurul989@uitm.edu.my*

PROJECT DESCRIPTION

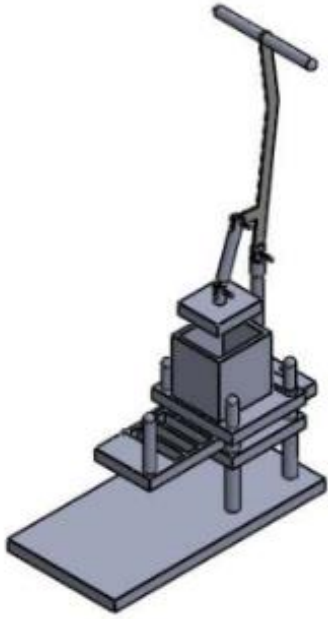
Many initiatives have been done by the government to increase national productivity. The government also wants to increase efforts to purchase local goods from small entrepreneurs that are called *Industri Kecil Sederhana*. This project exists to help small entrepreneurs that need something to ease them for their business. This project focus on the process of manufacture the fish cake. The problem was that they need to increase the productivity to achieve their profit goal. At the same time, they must make sure that the quality and size is maintained as it is. Therefore, the main objective is to design and fabricate a fish cake-forming machine. This machine is targeted for small industry therefore, the size of the machine is much smaller than the current industrial fish cake forming machine so that the cost also can be reduce as well. In general, the design process is using Morphological chart to select the best concept, a Pugh chart to determine the final concept design of a product, where the design is using SolidWorks software. Based on the selected design concept, it is then will be fabricated. The expected result is that the machine will be able to run properly and will be available on the market.

Keywords: *Fish cake forming, Design, Small industry, Food industry*

PROTOTYPE

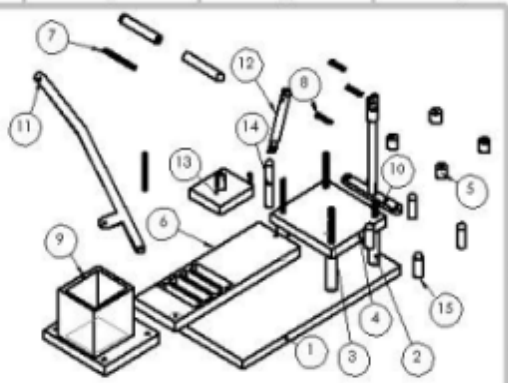


DESIGN PARAMETER



| | | | | |
|--|---------------------|--|------------------------|-----------------------|
| FAKULTI KEJURUTERAAN MEKANIKA (FKM) UNIVERSITI TEKNOLOGI MARA (UTM) JOHOR KAMPUS PASIR GUDANG | | | | |
| Course Name | | MEC299 - FINAL YEAR PROJECT 1 SESSION: MARCH 2022 - AUGUST 2022 | | |
| Group | | J4EM1105K | | |
| Approved | Checked | Drawn Husa Binti Rasli (01/07/2022) | | |
| Drawing Title FISH CAKE FORMING MACHINE | | | | |
| Part Name - | | | | |
| Part No. - | | | | |
| Rev. 0 | Scale 1:6 | Projection | Weight 8.5kg | Sheet 12/13 |

| PART NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|------------------------|---------------------------|------|
| 1 | MACHINE BASE | 513mmL x 260mmW x 25mmH | 1 |
| 2 | POLE BASE | Dia 25mm x 100mmL | 4 |
| 3 | STUD | Dia 8mm x 165mmL | 4 |
| 4 | PLATE | 178mmL x 196mmW x 25mmH | 1 |
| 5 | STANCHIONS 1, 2SD, 2SH | Dia 25mm x 25mmH | 4 |
| 6 | MOULD PLATE SLIDE | 407mmL x 132mmW x 25mmH | 1 |
| 7 | STUD | Dia 6mm x 100mmL | 2 |
| 8 | Bolt | Dia 66mm | 5 |
| 9 | FILL TUBE SET | 178mmL x 196mmW x 151mmH | 1 |
| 10 | LEVER POLE | 183mmL x 25mmW x 260mmH | 1 |
| 11 | LEVER | 465.55mmL x 83mmW x 3mmH | 1 |
| 12 | PISTON 2 | Dia 245mm x 130mmL | 1 |
| 13 | PISTON | 96mmL x 108mmW x 77.89mmH | 1 |
| 14 | KNOB | Dia 29mm x 20mm | 3 |
| 15 | KNOB 2 | Dia 29mm x 60mmL | 4 |



| | | | | |
|--|---------------------|--|------------------------|-----------------------|
| FAKULTI KEJURUTERAAN MEKANIKA (FKM) UNIVERSITI TEKNOLOGI MARA (UTM) JOHOR KAMPUS PASIR GUDANG | | | | |
| Course Name | | MEC299 - FINAL YEAR PROJECT 1 SESSION: MARCH 2022 - AUGUST 2022 | | |
| Group | | J4EM1105K | | |
| Approved | Checked | Drawn Husa Binti Rasli (01/07/2022) | | |
| Drawing Title FISH CAKE FORMING MACHINE | | | | |
| Part Name - | | | | |
| Part No. - | | | | |
| Rev. 0 | Scale 1:6 | Projection | Weight 8.5kg | Sheet 13/13 |