

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 Muizuddin 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 87

Design and Fabrication of Portable Solar Cooker

Intanku Sofea Mohamad Zaidi ¹ and Muhamad Faris Syafiq Khalid ^{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): mfarissyafiq@uitm.edu.my*

PROJECT DESCRIPTION

Solar cookers are an innovative solution for cooking food using solar energy, reducing the need for traditional fuel sources, and promoting sustainability. However, existing solar cookers are often costly and not eco-friendly. This project aims to design and develop a modified version of a portable solar cooker that is more affordable and eco-friendlier while maintaining the same functionality as existing products. Existing solar cookers are often costly and made from materials that are not eco-friendly. This limits their accessibility and sustainability, particularly for individuals and communities that prioritize nature conservation. The primary objective of this project is to design and develop a portable solar cooker that is eco-friendlier and more affordable than existing products. The cooker must function effectively using solar energy as its sole source of power. The use of aluminium as a substitute for stainless steel will also be explored to reduce manufacturing costs and improve accessibility. The solar cooker was designed and fabricated using aluminium as a substitute for stainless steel to reduce manufacturing costs while maintaining functionality. The cooker was tested and evaluated for its cooking efficiency, durability, and user-friendliness. The use of aluminium as a substitute for stainless steel in the fabrication of the solar cooker reduced manufacturing costs by up to 70%. The cooker functioned effectively using solar energy as its sole source of power, promoting sustainability. The aluminium material also made it easy for users to find spare parts if needed. The solar cooker was user-friendly and demonstrated efficient cooking capabilities.

Keywords: *Portable solar cooker, Eco-friendly, Sustainability, Solar energy*

PROTOTYPE



DESIGN PARAMETER

