

PROTOTYPE DESIGN COLLECTION

SERIES 1



Copyright © 2022 Prototype Design Collection Series 1.

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 Department, School of Mechanical Engineering (Pusat Pengajian Kejuruteraan Mekanikal), Universiti Teknologi MARA Johor Branch, Pasir Gudang Campus.

e-ISBN: 978-967-0033-07-5

First published, 30 September 2022

EDITORS:

Ahmad Najmie Rusli

Nurul Nadiah Rasdi

PUBLISHED BY:

Pusat Pengajian Kejuruteraan Mekanikal,
Universiti Teknologi MARA Cawangan Johor,
Kampus Pasir Gudang,
Jalan Purnama, Bandar Seri Alam,
81750 Masai,
Johor Darul Ta'zim.
Tel: +60 7-381 8493

Table of Contents

CHAPTER 1	1
Fabrication of Mini Hydroelectric Generator	1
Muhammad Firdaus Bin Rashidy and Zeno Michael	1
CHAPTER 2	3
Design, Analysis and Fabrication of Semi-automated Potato Peeler Machine	3
Muhammad Arif Syahmi Mohd Sohaimi and Mohd Fadzli Ismail	3
CHAPTER 3	5
Design & Fabrication of Multipurpose Household Drying Cloth and Canopy	5
Muhammad Danial Zikri Bin Abdul Jami and Zeno Michael	5
CHAPTER 4	7
Full-Body Sanitizing Machine	7
Abdul Rashid Bin Nasir and Hazriel Faizal Pahraraji	7
CHAPTER 5	9
Motorized Clothes Hanger	9
Mohamad Mustaqim Bin Musthafah and Nur Aini Sabrin Binti Manssor	9
CHAPTER 6	11
Fabrication Prototype of Agricultural Bar Sprayer	11
Ferdinand Dana Anak Alexander and Nur Aini Sabrin Binti Manssor	11
CHAPTER 7	13
Design, Analysis and Fabrication of Automatic Feeder for Cows	13
Jennifer Jenih Anak Engkamat and Norhisyam Jenal	13
CHAPTER 8	15
To Design and Fabricate of An Innovative Multipurpose Hand Truck	15
Muhammad Danish Bin Dzulhelmy and Zeno Michael	15
CHAPTER 9	18
Design and Fabricate Waste Collector Prototype	18
Muhammad Faiszam Bin Isnin and Zeno Michael	18
CHAPTER 10	21
Multifunctional Pickup Tool	21
Nurul Izzatul Binti Azian and Azizul Hakim Bin Samsudin	21
CHAPTER 11	23
Food Cover	23
Wan Zahra' Mardiah Binti Amran and Azizul Hakim Bin Samsudin	23

CHAPTER 12	25
Mechanical Rice Washer	25
Schufee Amani Bin Suhaime and Azizul Hakim Bin Samsudin	25
CHAPTER 13	27
Design, Analysis and Fabrication of Shoe Dryer	27
Muhammad Akmal Hazim Abdul Halim and Mohd Fadzli Ismail.....	27
CHAPTER 14	29
Mini Plastic Injection Moulding	29
Muhammad Arsyad Bin Nashrol Azam and Mohd Fadzli Ismail	29
CHAPTER 15	31
Design and Fabrication of Spring Roll Maker	31
Afiq Rahman Bin Mohammad and Ahmad Najmie Rusli	31
CHAPTER 16	33
Design, Analysis and Fabrication of Mini Curry Puff Machine	33
Aliah Maisarah Binti Nordin and Ahmad Najmie Rusli	33
CHAPTER 17	35
Design, Analysis and Fabrication of Dish Drying Rack	35
Nur Amalia Binti Zahid and Mohd Noor Halmy Ab Latif	35
CHAPTER 18	37
Design, Analysis and Fabrication of Mini Car Automated Road and Floor Dust Cleaning Machine	37
Hedzry Shafry B. Redzuan Shafry and Suhadiyana Hanapi	37
CHAPTER 19	39
Design, Analysis and Fabrication of Multipurpose Kitchen Utensils	39
Iman Qistina Abdul Razak and Suhadiyana Hanapi	39
CHAPTER 20	41
Design, Analysis and Fabrication of Manual Dust Cleaner for Floor	41
Mohamad Syafiq Bin Mokhzaine and Nurrul Amilin Binti Zainal Abidin	41
CHAPTER 21	43
Design, Analysis and Fabrication of Can Crusher	43
Muhammad Danish Bin Izrin Kheirany and Norjasween Binti Abdul Malik.....	43
CHAPTER 22	45
Design, Analysis and Fabrication of Portable Dish Washer	45
Muhammad Fakhrurazi Bin Abdul Razak and Norjasween Binti Abdul Malik	45

CHAPTER 23	47
Design, Analysis and Fabrication Simplified Drain Wastage Cleaner Device	47
Muhammad Ikram Hafiz Bin Zaidi Farouk and Abdul Hadi Abdul Rahim @ Ibrahim	47
CHAPTER 24	49
Design, Analysis and Fabrication of Portable Table Saw	49
Dzafran Amani Bin Munir and Ahmad Faizal Khodori.....	49
CHAPTER 25	51
Design, Analysis and Fabrication of Tin Can Crusher.....	51
Muhammad Alif Hilmi Bin Osman and Nurrul Amilin Binti Zainal Abidin	51
CHAPTER 26	53
Design, Analysis and Fabrication of Staircase Climbing Trolley	53
Muhammad Ashraf Bin Saiful Adli and Nurrul Amilin Binti Zainal Abidin.....	53
CHAPTER 27	55
Motorized Adjustable Television Wall Mount	55
Aiman Hakim Amir James and Noor Hafiz Noordin	55
CHAPTER 27	57
Design, Analysis and Fabrication of Mini Clothes Dryer.....	57
Muhammad Shazmil Izzat Bin Mohd Sohaimi and Nurulnatisya Ahmad	57
CHAPTER 28	59
Design, Analysis and Fabrication of Automatic Knife Sharpener	59
Mohamad Faliq Bin Fadzil and Mohd Noor Halmy Ab Latif.....	59
CHAPTER 29	61
Secured Bicycle Parking Rack for UiTM Pasir Gudang.....	61
Nurul Nurfaizzah Binti Abdullah and Hazim Bin Sharudin	61
CHAPTER 30	63
Design and Fabrication of Glass Bottle Cutter	63
Nurul Alya Amanina Binti Mohd Ishak and Ab Aziz Bin Mohd Yusof	63
CHAPTER 31	65
Design, Analysis and Fabrication of Automatic Lawnmower	65
Nur Amirah Binti Mazlan and Haszeme Bin Abu Kasim	65
CHAPTER 32	67
Design, Analysis and Fabrication of Carpet Cleaner	67
Nur Miesya Maisara Binti Nor Yazid and Haszeme Bin Abu Kasim.....	67
CHAPTER 33	69

Cement Apply Helper	69
Mohamad Fakhri Bin Mohammad Sukri and Nurrul Amilin Binti Zainal Abidin	69
CHAPTER 34	71
Design, Analysis and Fabrication of Portable Grill Machine	71
Muhammad Harith Bin Zainul Asri and Nur Kamarliah Kamardin	71
CHAPTER 35	73
Design, Analysis, and Fabrication of Iron Clothes.....	73
Izzah Atirah Binti Ahmad Sirfan and Mohd Noor Halmy Ab Latif	73
CHAPTER 36	75
Design, Analysis, and Fabrication of Automatic Portable Hammering Machine.....	75
Fareez Bin Ahmad Taupiq Nasri and Ahmad Faidzal Khodori.....	75
CHAPTER 37	77
Design, Analysis, and Fabrication of Street Sweeper Machine	77
Awangku Muhammad Dzul Hisyam Bin Awang Basuandi and Ahmad Faidzal Khodori	77
CHAPTER 38	79
Design, Analysis, and Fabrication of Portable Washing Machine	79
Nur Syafiah Binti Abu Bakar and Nurulsaidatulsyida Binti Sulong.....	79
CHAPTER 39	81
Design, Analysis, and Fabrication of Pet Food Refill	81
Raja Nuryasmin Balqis Bt Raja Zainud and Nurulsaidatulsyida Binti Sulong	81
CHAPTER 40	83
Indoor Smart Vase Self-Watering Plant.....	83
Muhammad Nur Amni Khariman and Najibah Ab Latif	83
CHAPTER 41	85
Design of Solar Powered Light for Remote Country with Poor Lighting.....	85
Muhammad Imran Roslan and Najibah Ab Latif.....	85
CHAPTER 42	87
Design, Analysis and Fabrication of Semi-Auto Cup Rinser	87
Muhammad Amar Zakwan Bin Anuar and Raja Muhammad Aslam Raja Arif.....	87
CHAPTER 43	89
Design, Analysis and Fabrication of Manual Food Slicer Machine	89
Muhammad Fareed Johari and Raja Muhammad Aslam Raja Arif	89
CHAPTER 44	91
Automatic Laptop Stand	91
Amirul Haziq Roselin and Noor Hafiz Noordin.....	91

CHAPTER 45	93
Automatic Postbox Opener for Parcel	93
Afiq Syafi Mohd Suhaimi and Noor Hafiz Noordin	93
CHAPTER 46	95
Design, Analysis and Fabrication of Automated Shirt Folder	95
Muhammad Hafiz Kamal Bin Mohamad Kamal and Syidatul Akma Sulaiman	95
CHAPTER 47	97
Development of a Prototype Fingerprint Safety Padlock Using Arduino for Motorcycle	97
Muhammad Nur Eidham Bin Norizan and Wan Muhammad Syahmi Wan Fauzi	97
CHAPTER 48	99
Development of a Beach Cleaning Machine	99
Muhammad Syahir Bin Mohamad Tazri and Wan Muhammad Syahmi Wan Fauzi	99
CHAPTER 49	101
Development of a Floatation Platform for a Water Trash Collector	101
Muhammad Aidil Irfan Bin Mat Nawi and Norhisyam Jenal	101
CHAPTER 50	103
Design and Fabrication of Ergonomic Gaming Mouse	103
Muhammad Faris Azri Bin Shamsulasri and Zeno Michael	103
CHAPTER 51	105
Design and Fabrication of An Innovative 360o Degree Standing Fan	105
Muhammad Hazeq Bin Misuan and Zeno Michael	105
CHAPTER 52	107
Development of Propulsion System for Water Trash Collector	107
Raudah Binti Nordin and Norhisyam Jenal	107
CHAPTER 53	109
Design and Fabrication of Motorized Bench Vise	109
Isyraf Zikry Bin Hafidzal and Nur Aini Sabrin Binti Manssor	109
CHAPTER 54	111
Design, Analysis and Fabrication of Adjustable Wrench	111
Muhammad Amirul Aiman Mohd Faizal and Mohd Fadzli Ismail	111
CHAPTER 55	113
Design of Alternative Way to Refill Waffle Maker Machine	113
Seri Fazira Nuraisya Binti Rosli and Nurulsaidatulsyida Binti Sulong	113
CHAPTER 56	115

Design, Analysis and Fabrication of Mini Belt Sander.....	115
Azad Hazim Bin Bahrulashikin and Ahmad Faidzal Khodori.....	115
CHAPTER 57	117
Design, Analysis and Fabrication of Hydraulic Jack.....	117
Ammar Bin Azman and Suhadiyana Hanapi.....	117
CHAPTER 58	119
Design and Fabrication of Innovation of Goods Sanitizer	119
Muhammad Faez Haikhal Bin Mohd Fuad and Zeno Michael	119
CHAPTER 59	121
Design, Analysis and Fabrication of Sheet Metal Bender	121
Ahmad Fareez Izham Bin Che Ramli and Ahmad Najmie Rusli	121
CHAPTER 60	123
Design, Analysis and Fabrication of Mini Portable Kettle.....	123
Nur Farra Nazirah Binti Che Mohammad Saidi and Nurulsaidatulsyida Binti Sulong	123
CHAPTER 61	125
Design, Analysis and Fabrication of Ice Cream Machine with Dispenser	125
Nur'ain Humaira binti Mohamad Nasir and Nurulsaidatulsyida Binti Sulong	125
CHAPTER 62	127
Mini Agriculture Shovel with Cutter	127
Muhammad Izzat Shamsul Bahri and Najibah Ab Latif.....	127
CHAPTER 63	129
Development of a Piping System for a Flow Visualization Water Tunnel.....	129
Muhammad Aimi Aireez Bin Zamir and Norhisyam Jenal.....	129
CHAPTER 64	131
Development of an Adjustable-Motorized Wheelbarrow	131
Muhammad Syahrin Bin Suhaimi and Wan Muhammad Syahmi Wan Fauzi	131
CHAPTER 65	133
Design and Fabrication of Vegetable Slicing Machine	133
Muhammad Amirul Hafiz Amirzali and Mohd Fadzli Ismail.....	133
CHAPTER 66	135
Design, Analysis and Fabrication of Malay Traditional Snacks Cutter	135
Amirah Hanis Binti Azman and Ahmad Najmie Rusli	135
CHAPTER 67	137
Design, Analysis and Fabrication of Desk Mount Laptop Stand with Cooler.....	137
Anaqi Bunyamin Bin Zulhazmi and Ahmad Faidzal Khodori	137

CHAPTER 68	139
Design, Analysis and Fabrication of Wire Cutting Machine	139
Muhammad Nabil Bin Saeman and Abdul Hadi Abdol Rahim @ Ibrahim	139
CHAPTER 69	141
Design, Analysis and Fabrication of Semi-Auto Kuih Siput Maker	141
Nornatasha Binti Azani and Nurrul Amilin Binti Zainal Abidin	141
CHAPTER 70	143
Design, Analysis and Fabrication of 2 in 1 French Fries Machine	143
Ahmad Hakim Bin Khamis and Ahmad Najmie Rusli.....	143
CHAPTER 71	145
Foldable Multifunction Hand Trolley	145
Muhammad Luqman Fahmi Mohd Zaki and Najibah Ab Latif	145
CHAPTER 72	147
Design, Analysis and Fabrication of Shoes Dryer	147
Muhammad Ruzaini Bin Harun and Abdul Hadi Abdol Rahim @ Ibrahim	147
CHAPTER 73	149
Design, Analysis and Fabrication of Climbing Spinning Cart	149
Muhammad Syamin Haiman Bin Harun and Abdul Hadi Abdol Rahim @ Ibrahim	149
CHAPTER 74	151
Design, Analysis and Fabrication of Ceiling Fan Wiper	151
Nouqib Aizad Azryil Bin Mat Azim and Haszeme Bin Abu Kasim	151
CHAPTER 75	153
Design, Analysis and Fabrication of An Escalator Model for Educational Purposes	153
Ahmad Harith Bin Abdullah, Ilya Izyan Binti Shahrul Azhar and Miqdad Bin Khairulmaini	153
CHAPTER 76	155
Design, Analysis and Fabrication of Grill and Fry Box	155
Farries Hazieq Bin Nor Fauzy and Muhamad Faris Syafiq Bin Khalid.....	155
CHAPTER 77	157
Design, Analysis and Fabrication of Wheel Dolly Jack	157
Muhammad Haiqal Danish Bin Ahmad and Nor Liawati Abu Othman	157
CHAPTER 78	159
Design, Analysis and Fabrication of Mechanical Leaves Scraper	159
Nur Fatihah Binti Saiful Effendy and Ahmad Faidzal Khodori.....	159
CHAPTER 79	161

Design, Analysis and Fabrication of Solar Power Bank Using Recycle Battery	161
Aqil Hafiz Tsen Loong Tyan and Suhadiyana Hanapi.....	161
CHAPTER 80	163
Design, Analysis and Fabrication of Mini Taffy Puller	163
Amiratul Aqilah Binti Mohd Zainol and Suhadiyana Hanapi	163
CHAPTER 81	165
Design and Fabricate of Solar Box Cooker	165
Muhammad Shahir Bin Ismail and Abdul Hadi Abdol Rahim @ Ibrahim.....	165
CHAPTER 82	167
Design, Analysis and Fabricate of Automatic Noodle Making Machine	167
Azril Firdaus Bin Azmi and Ahmad Faidzal Khodori.....	167
CHAPTER 83	169
Design, Analysis and Fabricate of Coconut Water Juice Extractor.....	169
Ahmad Radhee Bin Athaillah and Ahmad Najmie Rusli.....	169
CHAPTER 84	171
Design, Analysis and Fabricate of Smart Vacuum Cleaner	171
Alif Bin Amaluddin and Ahmad Najmie Rusli	171
CHAPTER 85	173
Design, Analysis and Fabricate of Foldable and Adjustable Desk	173
Muhammad Ammar Amsyar Azran and Mohd Fadzli Ismail	173
CHAPTER 86	175
Design, Analysis and Fabricate of The Humidifier and Air Freshener	175
Muhammad Syazwan Fathullah Bin Mohd Yunus and Nor Liawati Abu Othman	175
CHAPTER 87	177
Design and Fabricate of Road Cleaning Machine.....	177
Ahmad Safwan Bin Ariffin and Haszeme Bin Abu Kasim.....	177
CHAPTER 88	179
Design, Analysis and Fabrication of Seed Machine	179
Muhammad Zakwan Bin Zainol Arifen and Haszeme Bin Abu Kasim	179
CHAPTER 89	181
Drain Cleaner	181
Nik Muhammad Haiqal Bin Nik Muhammad Shukrri and Haszeme Bin Abu Kasim	181
CHAPTER 90	183
Design, Analysis and Fabrication of Chapatti Mini Making Machine.....	183
Norshamimie Binti Mohd Nazir and Haszeme Bin Abu Kasim	183

CHAPTER 91	185
Design, Analysis and Fabrication of Remote-Controlled Mop	185
Nuqman Aliff Bin Masukor and Haszeme Bin Abu Kasim	185
CHAPTER 92	187
Design, Analysis and Fabrication of Portable Washing and Drying Machine	187
Muhammad Zarif bin Abdul Aziz and Haszeme Bin Abu Kasim	187
CHAPTER 93	189
Design and Fabrication of Hydraulic Crane for Preschool Education Purpose	189
Alnizar and Zeno Michael.....	189
CHAPTER 94	191
Design and Fabrication of Automatic Fishing Rod Snatcher	191
Muhammad Hakim Bin Rasdi and Nur Kamarliah Kamardin	191
CHAPTER 95	193
Design and Development of Mini Wind Tunnel for Replicate Aeroplane	193
Alisa Syafiqah Bin Jasmi and Ab Aziz Bin Mohd Yusof	193
CHAPTER 96	195
Design and Fabrication of a Portable Hack Saw Machine.....	195
Danish Haikal Bin Mohamad Hamzani and Miqdad Bin Khairulmaini	195
CHAPTER 97	197
Design and Fabrication of a Fan Cleaning Machine.....	197
Balqis Safiyyah Binti Othaman and Miqdad Bin Khairulmaini	197
CHAPTER 98	199
Portable Dry Leaf Sweeper Powered by a Single Motor.....	199
Siti Nurdyana Binti Mazlan and Wan Muhammad Syahmi Wan Fauzi	199

CHAPTER 76

Design, Analysis and Fabrication of Grill and Fry Box

Farries Hazieq Bin Nor Fauzy and Muhamad Faris Syafiq Bin Khalid

*College of Engineering (Mechanical), Universiti Teknologi MARA Johor Branch,
Pasir Gudang Campus, 81750 Masai, Bandar Seri Alam, Johor Darul Ta'zim.
Email: farriesjb@gmail.com*

PROJECT DESCRIPTION

All people like to perform barbeque especially for parties and gathering with family or friends. The problem of the project is to find the suitable material for the project, to find how to make a portable charcoal grill, and how to make a product that can grill and fry food at the same time. The main objectives of this project are to enable users to grill and fry food simultaneously, to make a lightweight and portable grill and fry machine, so users can bring it like a briefcase. I will use a steel electrical panel box, stainless steel plate, net, and mild steel plate. This machine includes a motor that will be used with a charcoal feeder as the mechanical part to ease users to put in and take out the charcoal from the box. I will go through all of the design, make an analysis, and make fabrication of the project within FYP 1 and FYP 2. Designing started with some drawings and then I will use Solidwork to make it more realistic. Also, it will involve some basic machining such as welding to make this project.

Keywords: *barbeque, charcoal grill, grill and fry food, charcoal feeder*

PROTOTYPE



DESIGN PARAMETER

