

# PROTOTYPE DESIGN COLLECTION

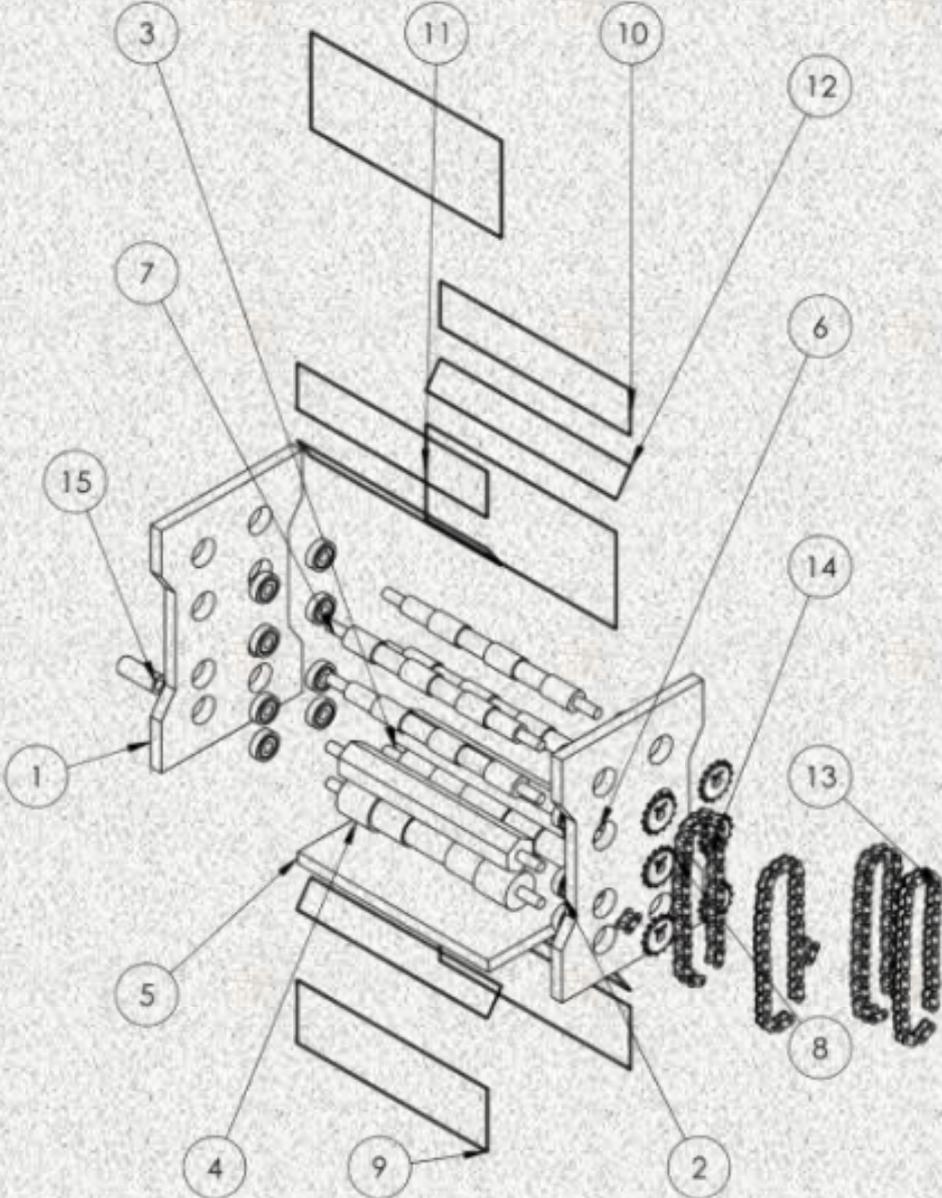
SERIES 4



Universiti Teknologi MARA  
Pasir Gudang Campus

# Prototype Design Collection

## Series 4



Ahmad Najmie Rusli

**Copyright © 2025 Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang,  
Jalan Purnama, Bandar Seri Alam, 81750 Masai Johor.**

All rights 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 the written permission of the Head of the Centre for Studies, Faculty of Mechanical Engineering, Universiti Teknologi MARA Johor Branch, Pasir Gudang Campus.

**CHIEF EDITOR:**

Ahmad Najmie Rusli

**EDITOR:**

Nurul Nadiyah Rasdi

**PUBLISHER:**

Universiti Teknologi MARA  
Cawangan Johor Kampus Pasir Gudang,  
Jalan Purnama, Bandar Seri Alam, 81750 Masai, Johor  
September 2025

eISBN: 978-967-0033-62-4

# FOREWORD

This digital book on Prototype Design Collection Series 4 (PDC Series 4) 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

<b>CHAPTER 1</b> .....	1
<b>Design and Fabrication of a Multipurpose Baby Cot</b> .....	1
Nabil Qayyum Bin Roslan <sup>1</sup> and Miqdad Bin Khairulmaini <sup>2*</sup> .....	1
<b>CHAPTER 2</b> .....	3
<b>Design and Fabrication of a Weather Sensing Cloth Drying Rack</b> .....	3
Mustaqim Syah Bin Kamarul Zaman <sup>1</sup> and Miqdad Bin Khairulmaini <sup>2*</sup> .....	3
<b>CHAPTER 3</b> .....	5
<b>Design and Fabrication of a Patient Transfer Aid for Seamless Bed to Wheelchair Mobility</b> ..	5
Fateen Aqela Binti Azzaidi <sup>1</sup> and Miqdad Bin Khairulmaini <sup>2*</sup> .....	5
<b>CHAPTER 4</b> .....	7
<b>Prototype of a Donut Topping Machine</b> .....	7
Nurul Athirah Binti Ramizan Nassir <sup>1</sup> and Ahmad Najmie Rusli <sup>2*</sup> .....	7
<b>CHAPTER 5</b> .....	9
<b>Prototype of a PLA Filament Extruder</b> .....	9
Abdul Harith Hazim Bin Abd Rashid <sup>1</sup> and Ahmad Najmie Rusli <sup>2*</sup> .....	9
<b>CHAPTER 6</b> .....	11
<b>Prototype of a Candy Sorting Machine</b> .....	11
Hairul Ikhwan Bin Hazizan <sup>1</sup> and Ahmad Najmie Rusli <sup>2*</sup> .....	11
<b>CHAPTER 7</b> .....	13
<b>Prototype of a 3D Printing Scrap Recycling Machine</b> .....	13
Raziq Amir Bin Rosdi <sup>1</sup> and Ahmad Najmie Rusli <sup>2*</sup> .....	13
<b>CHAPTER 8</b> .....	15
<b>Manual Compaction Machine for Casting</b> .....	15
Muhammad Hazim Md Azli <sup>1</sup> , Najibah Ab Latif <sup>2*</sup> and Ainaa Maya Munira Ismail <sup>3</sup> .....	15
<b>CHAPTER 9</b> .....	17
<b>Convertible Cart-Ladder</b> .....	17
Mohamad Aimi Zuhairi Fikri Mohd Aimi Zamani <sup>1</sup> , Najibah Ab Latif <sup>2*</sup> and Ainaa Maya Munira Ismail <sup>3</sup> .....	17
<b>CHAPTER 10</b> .....	19
<b>Design and Fabrication of Mini Firefighting Device</b> .....	19
Adam Faris Bin Ahmad Zaidy <sup>1</sup> and Muhamad Faris Syafiq Bin Khalid <sup>2*</sup> .....	19
<b>CHAPTER 11</b> .....	21
<b>Design and Fabrication of Shuttlecock Launcher Machine</b> .....	21

## CHAPTER 25

### Coin Sorter Machine

Muhamad Nazif Muhamad Nazir <sup>1</sup> and Mohd Fadzli Ismail <sup>2\*</sup>

<sup>1,2</sup>*Faculty of Mechanical Engineering, Universiti Teknologi MARA Johor Branch, Pasir Gudang Campus, 81750 Masai, Bandar Seri Alam, Johor Darul Ta'zim.*

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

#### PROJECT DESCRIPTION

Manual coin handling poses significant challenges for small businesses due to its inefficiency, inaccuracy and labour-intensive nature. It made even more difficult by the expensive and bulky nature of commercial sorting machines. This study addresses these issues by developing a low cost and compact prototype coin sorter machine designed for Malaysian coin denominations. The aim of this project is to design and fabricate a user-friendly sorting device that enhanced sorting accuracy and operational reliability. The methodology involved a structured design approach using SolidWorks for modelling and analysis, followed by material selection such as steel for the body and acrylic for coin trays. The prototype was then fabricated through cutting, joining, and assembly processes. Experimental results demonstrate that the coin sorter machine operates effectively, accurately distinguishing and sorting 5, 10, 20, and 50 cent coins using size-calibrated channels. The machine demonstrated reliable performance in terms of sorting speed, energy efficiency, and ease of use. In conclusion, the project proves the viability of an affordable automated coin sorter, offering improved productivity, cost savings and convenience for small-scale applications.

**Keywords:** *Coin Sorter, Sorting Device*

#### PROTOTYPE



DESIGN PARAMETER

