

# PROTOTYPE DESIGN COLLECTION

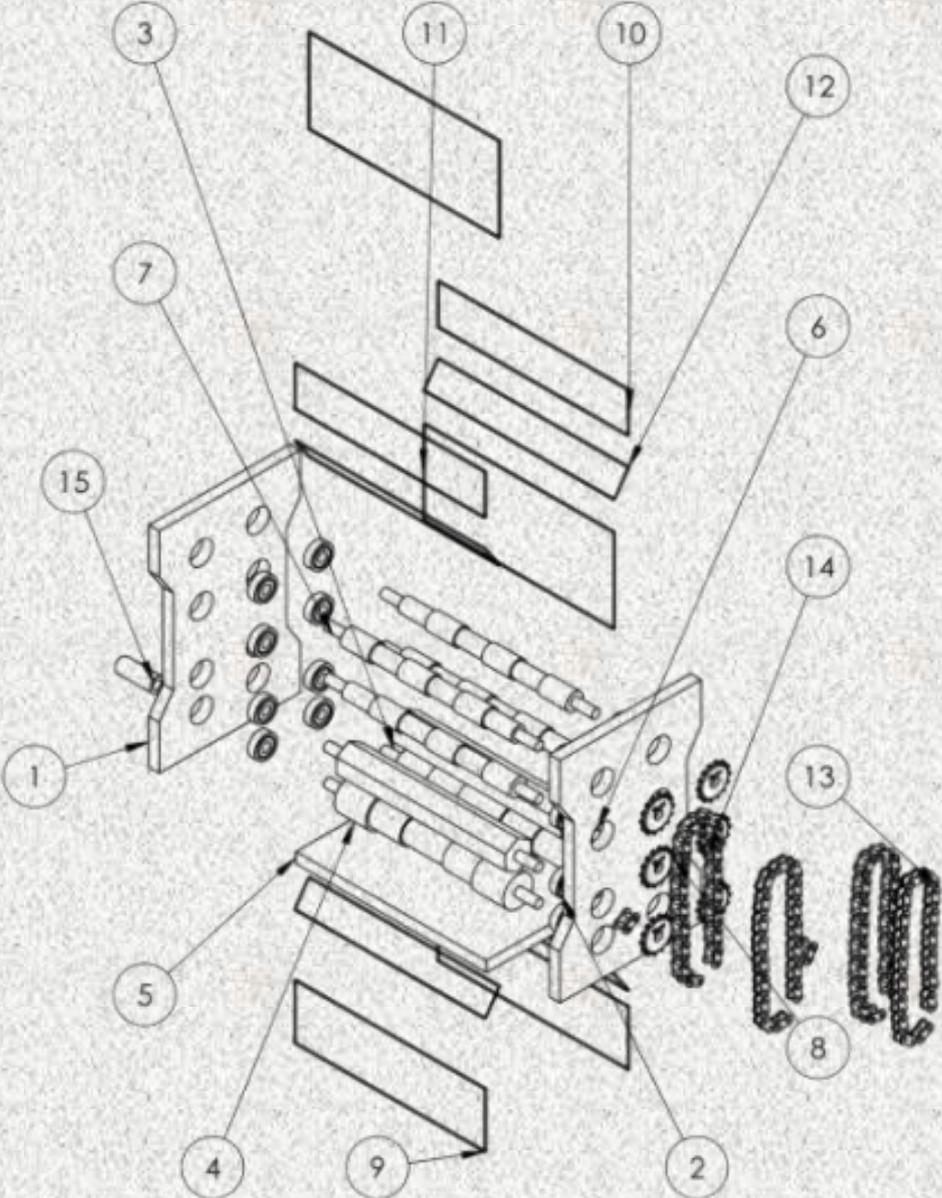
SERIES 4



Universiti Teknologi MARA  
Pasir Gudang Campus

# Prototype Design Collection

## Series 4



Ahmad Najmie Rusli

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# 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.

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## CHAPTER 4

### Prototype of a Donut Topping Machine

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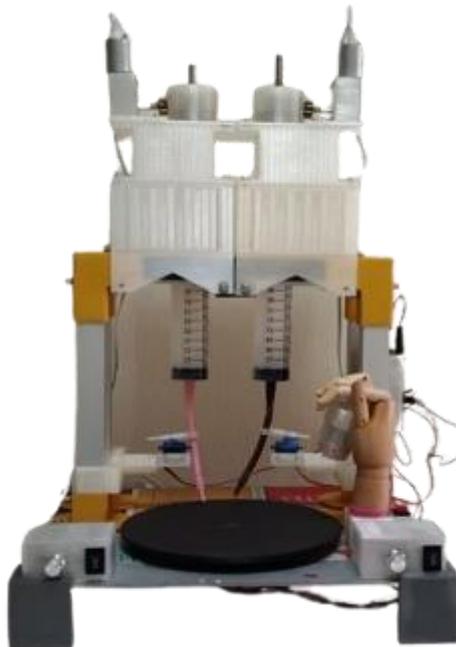
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#### PROJECT DESCRIPTION

This project presents a prototype of a donut topping machine designed to enhance the efficiency and consistency of topping application in donut production. The system addresses the common challenges faced by donut vendors in achieving uniform topping coverage and fast operation. The machine features two automated dispensers capable of applying various dry toppings, such as sprinkles and icing sugar. During operation, the dispensers move in a zig-zag pattern, while the donut is automatically rotated on its base to ensure full surface coverage. An optional sprinkler function is included to apply an additional layer of topping when selected by the user. The system is powered by a 12V DC motor and controlled via an Arduino microcontroller for precise timing and movement coordination. The dispenser motion is driven by a power screw mechanism, with adjustable speed control enabled by a bevel gear system. This prototype demonstrates a low cost, semi-automated solution aimed at improving topping application consistency and reducing manual labor in small to medium scale donut operations.

**Keywords:** *Donut machine, Donut topping*

#### PROTOTYPE



DESIGN PARAMETER

