

# PROTOTYPE DESIGN COLLECTION

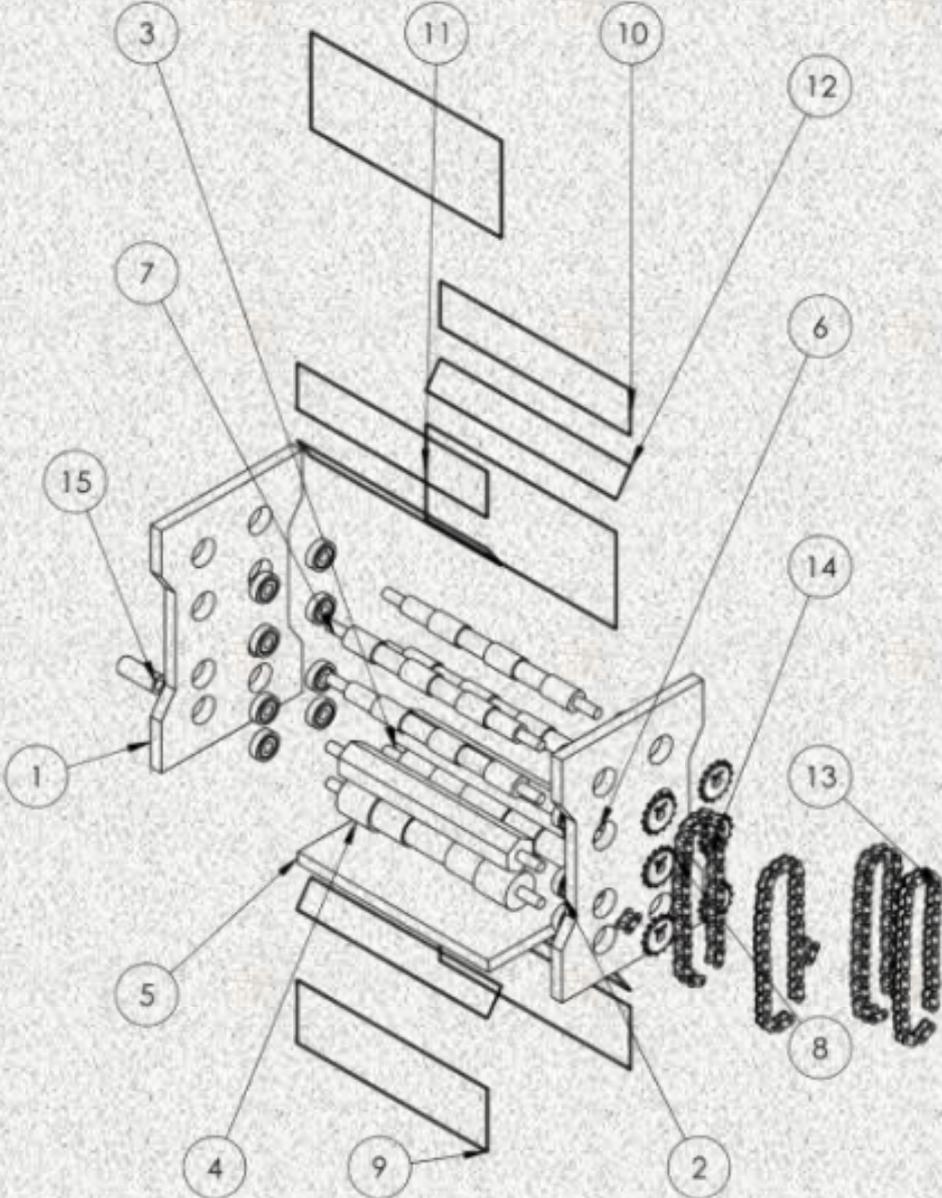
SERIES 4



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 5

### Prototype of a PLA Filament Extruder

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#### PROJECT DESCRIPTION

This project aims to design, develop and fabricate a low cost prototype of a PLA filament extruder as a proof of concept. The extruder features a horizontal extrusion process and is equipped with a heating element controlled by a temperature controller to ensure consistent melting. A 12V DC motor is used to regulate the extrusion speed providing better control over filament quality. The system is designed to produce filament with a uniform diameter of 1.7mm. The design process involves studying existing models, redesigning using computer-aided design (CAD) software and performing mechanical and electrical fabrication. This project promotes sustainability, reduces filament cost and makes filament recycling accessible for home users. The goal is to produce a compact, affordable and functional filament extruder that supports sustainable practices, reduces filament costs and increases accessibility for personal or small scale use. This prototype could significantly contribute to eco friendly 3D printing and promote responsible material usage within the growing community of 3D printing enthusiasts and professionals.

**Keywords:** *Filament, Filament extruder*

#### PROTOTYPE



**DESIGN PARAMETER**

