

PROTOTYPE DESIGN COLLECTION

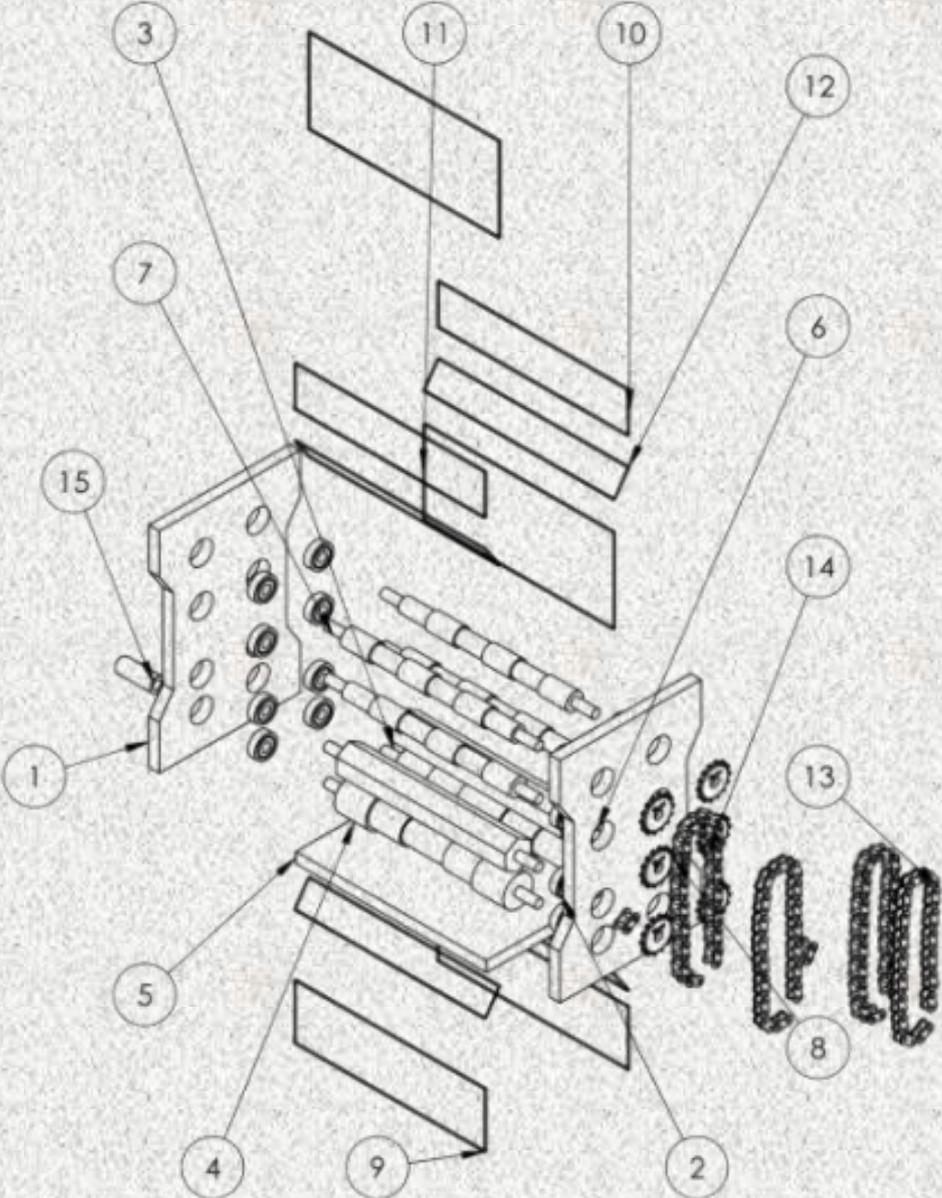
SERIES 4



Universiti Teknologi MARA
Pasir Gudang Campus

Prototype Design Collection

Series 4



Ahmad Najmie Rusli

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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.

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CHAPTER 2

Design and Fabrication of a Weather Sensing Cloth Drying Rack

Mustaqim Syah Bin Kamarul Zaman ¹ and Miqdad Bin Khairulmaini ^{2*}

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PROJECT DESCRIPTION

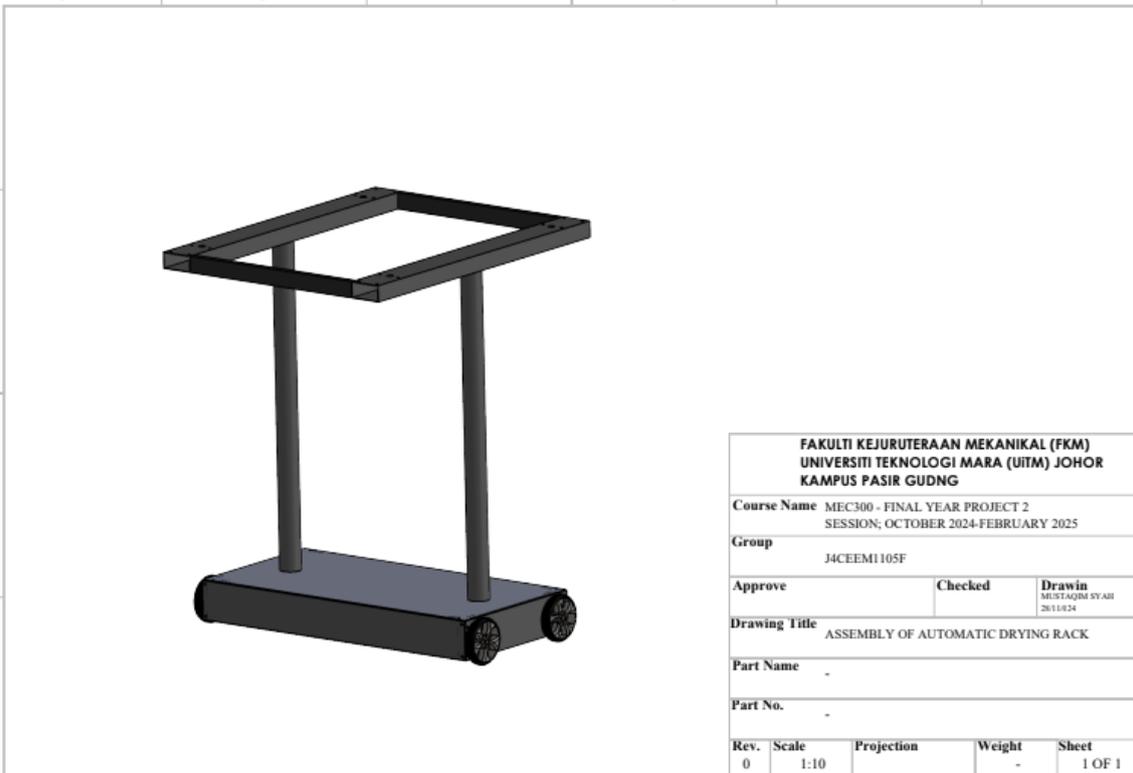
Traditional cloth drying racks pose challenges in unpredictable weather, requiring frequent user intervention. This project focuses on designing and fabricating an automated weather-sensing cloth drying rack equipped with a rain sensor and motorized retractable system to enhance drying efficiency and user convenience. The design process involved concept development, CAD modeling, material selection, and fabrication using mild steel for structural stability. Engineering analysis determined the maximum load capacity (3kg), motor torque requirements, and force distribution to ensure smooth operation. Testing validated that the rain sensor successfully detected precipitation within 3 seconds, triggering the rack's automatic retraction, effectively protecting clothes from rain. Performance evaluation indicated efficient mechanical operation with minimal response delay. However, improvements in sensor calibration, wind resistance, and structural reinforcement are recommended for future enhancements. This project demonstrates the feasibility of integrating automated drying solutions in residential applications, providing a reliable, user-friendly, and weather-adaptive alternative to manual drying methods.

Keywords: *Automated Drying Rack, Weather-Sensing System*

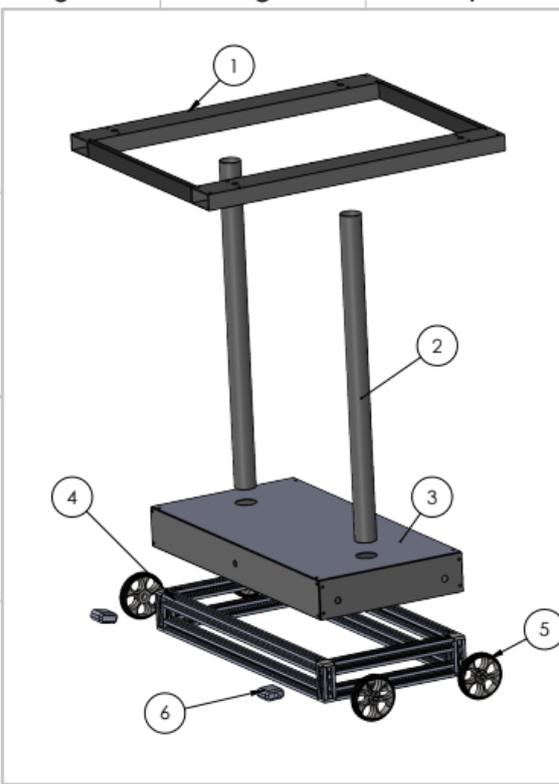
PROTOTYPE



DESIGN PARAMETER



FAKULTI KEJURUTERAAN MEKANIKAL (FKM) UNIVERSITI TEKNOLOGI MARA (UITM) JOHOR KAMPUS PASIR GUDNG				
Course Name MEC300 - FINAL YEAR PROJECT 2 SESSION; OCTOBER 2024-FEBRUARY 2025				
Group J4CEEM1105F				
Approve		Checked		Drawn MUSTAQIM SYAH 28/11/24
Drawing Title ASSEMBLY OF AUTOMATIC DRYING RACK				
Part Name -				
Part No. -				
Rev. 0	Scale 1:10	Projection	Weight -	Sheet 1 OF 1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Hanger Base	Stainless Steel	1
2	Hollow Rod	Stainless Steel	2
3	Cover	Aluminum	1
4	Frame	Aluminum Profile	1
5	Wheel	Rubber	4
6	Motor	Steel	2

FAKULTI KEJURUTERAAN MEKANIKAL (FKM) UNIVERSITI TEKNOLOGI MARA (UITM) JOHOR KAMPUS PASIR GUDNG				
Course Name MEC300 - FINAL YEAR PROJECT 2 SESSION; OCTOBER 2024-FEBRUARY 2025				
Group J4CEEM1105F				
Approve		Checked		Drawn MUSTAQIM SYAH 28/11/24
Drawing Title EXPLODED OF AUTOMATIC DRYING RACK				
Part Name -				
Part No. -				
Rev. 0	Scale 1:10	Projection	Weight -	Sheet 1 OF 1