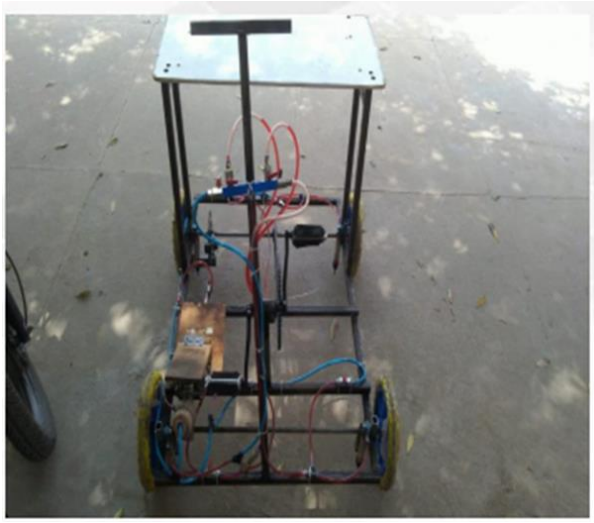
Mechanical Engineering Projects



Brake Pedal Operated Hydraulic Jack Inbuilt in a Four-Wheeler

 Achievement: Awarded **1st Prize** by **Guru Gobind Singh Indraprastha University (GGSIPU), 2019**

- **Branch:** Mechanical Engineering (ME)
- **Batch:** 2015–2019
- **Project Title:** Brake Pedal Operated Hydraulic Jack Inbuilt in a Four-Wheeler
- **Team Members:**

03915611115	Shivam Shekhar
04115611115	Shubham
03815611115	shashikant Sharma
00031568216	Gaurav Nainawal
40315611115	Md. Aquil

- **Project Guide:** *Ms. Richa Jain*

Project Description:
This project presents an innovative hydraulic jack system integrated with the brake pedal mechanism of a four-wheeler. The design enables vehicle lifting using hydraulic pressure generated through the brake pedal, eliminating the need for a separate manual jack. The system aims to improve safety, reduce physical effort, and minimize the time required for changing a tyre during emergencies.

Air Purifier & Humidifier

- **Branch:** Mechanical Engineering (ME)
- **Batch:** 2017–2021
- **Project Title:** Air Purifier & Humidifier

Team Members

University Enrollment No.	Student Name
00415608218	Shubham
00215608218	Deepak Bhatt
20115611117	Simranjeet Singh

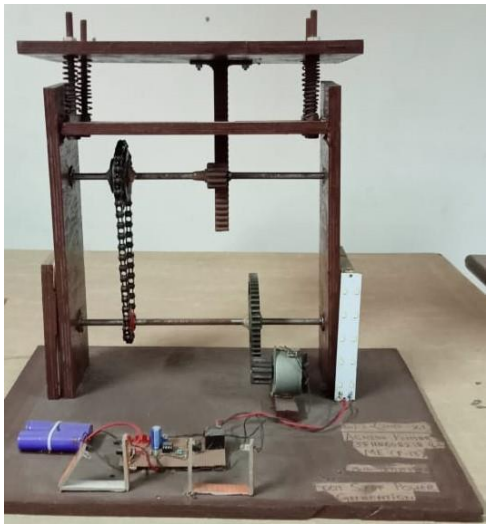
- **Project Supervisor:** Mr. Nitin Sehra

Project Description

The primary objective of this project is to design and develop an **Air Purifier & Humidifier** capable of improving indoor air quality by effectively removing airborne pollutants while maintaining optimal humidity levels. The system incorporates a **three-stage advanced filtration process** consisting of:

- **Cold Catalyst Filter** – Removes harmful gases and volatile organic compounds (VOCs).
- **Cellular Activated Carbon Filter** – Eliminates unpleasant odours, smoke, and hazardous chemical pollutants.
- **HEPA (High-Efficiency Particulate Air) Filter** – Captures fine particulate matter such as dust, pollen, allergens, bacteria, and other microscopic airborne contaminants.

The integrated humidification unit helps maintain a comfortable indoor humidity level, reducing dryness and enhancing overall air quality. The project offers an energy-efficient, compact, and cost-effective solution for residential and office environments, promoting a healthier and more comfortable living space.



Foot Step Power Generation

- **Branch:** Mechanical Engineering (ME)
- **Batch:** 2017–2021
- **Project Title:** Foot Step Power Generation

Team Members

University Enrollment No.	Student Name
35115608218	Ashish Kumar

- **Project Supervisor:** Mr. Mohit Garg

Project Description

The primary objective of this project is to generate electrical energy using a **non-conventional and renewable energy source** by harnessing the mechanical energy produced from human footsteps. The system converts the pressure exerted during walking or running into electrical energy through an energy conversion mechanism. The generated power can be stored in rechargeable batteries and utilized for low-power applications such as LED lighting, streetlights, emergency lighting systems, and other small electronic devices. This project demonstrates an eco-friendly, cost-effective, and sustainable approach to energy generation, particularly in high-footfall areas such as railway stations, shopping malls, schools, airports, and public walkways.

Key Features

The project generates electricity from human footsteps using a renewable and non-conventional energy source. It is an eco-friendly, low-maintenance, and cost-effective system, ideal for installation in high pedestrian traffic areas to produce clean electrical energy.

A Systematic Approach for Designing and Building Model UAV and Analysis using Wind Tunnel

- **Branch:** Mechanical Engineering (ME)
- **Batch:** 2017–2021
- **Project Title:** A Systematic Approach for Designing and Building Model UAV and Analysis using Wind Tunnel

Team Members

University Enrollment No.	Student Name
41115611117	Shubham Sharma
03115611117	Vaibhav Manchanda
41215611117	Sarthak Chadha
35415611117	Shubham Sehra
01715611117	Luv Goel

- **Project Supervisor:** Dr. Deepak Bhardwaj

Project Description

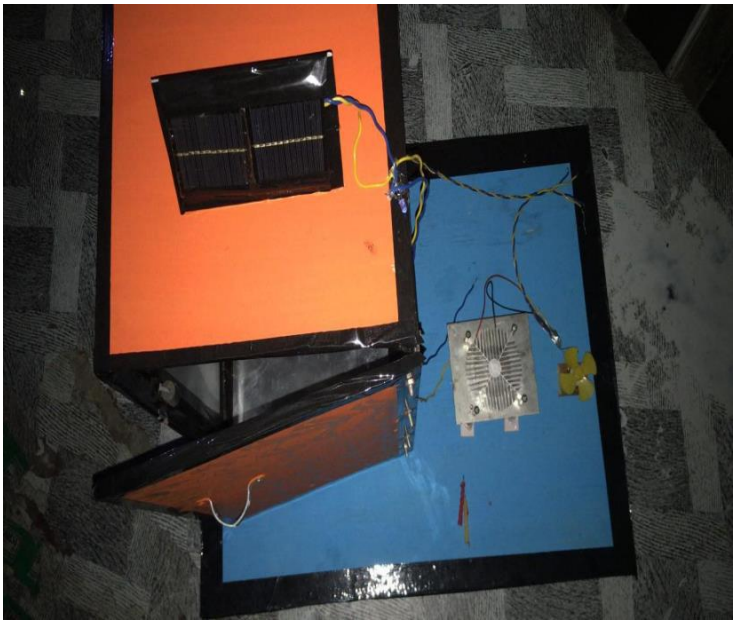
The primary objective of this project is to develop a **systematic approach for the design, fabrication, and performance analysis of a Model Unmanned Aerial Vehicle (UAV)** using wind tunnel testing. The project integrates principles of aerodynamics, structural analysis, material selection, and experimental validation to achieve an optimized UAV design with enhanced flight performance.

The methodology adopted in the project includes:

1. **Designing and analyzing the UAV geometry** to achieve the desired aerodynamic characteristics.
2. **Selecting suitable materials** for fabrication and assembly to ensure lightweight construction with adequate structural strength.

3. **Optimizing key design parameters** to maximize aerodynamic efficiency and overall performance.
4. **Identifying critical stress regions** and structural points on the wing and fuselage, including the determination of the neutral point and other important aerodynamic parameters.
5. **Conducting wind tunnel testing** to evaluate aerodynamic performance, validate design assumptions, and compare experimental results with theoretical predictions.

The project provides valuable insights into the complete UAV development process—from conceptual design to fabrication and experimental testing—while demonstrating the practical application of aerospace engineering concepts in the design and analysis of unmanned aerial systems.



Efficient Compressorless Refrigerator

- **Branch:** Mechanical Engineering (ME)
- **Batch:** 2017–2021
- **Project Title:** Efficient Compressorless Refrigerator

Team Members

University Enrollment No.	Student Name
04015611116	Satish Mogili
40215611117	Venu Goswami
02515611117	Raj Pratap Singh
02215611117	Nikhar Goutwal

- **Project Supervisor:** Mr. Rajat Gupta

Project Description

The primary objective of this project is to **design and develop an efficient compressorless refrigerator** that provides cooling without the use of a conventional compressor. The system employs an alternative cooling mechanism to achieve energy-efficient, eco-friendly, and cost-effective refrigeration, making it suitable for domestic and portable cooling applications.