

Guransh Singh Arora

guranshsingh5050@gmail.com | [Project Portfolio](#) | +91 9911555050 | [LinkedIn](#)

Profile Summary

Passionate Mechatronics Engineering student specializing in robotics, embedded systems, and intelligent hardware design. Experienced in developing autonomous robots, UAVs and secure IoT systems by combining cross-disciplinary engineering with a hands-on, problem-solving mindset.

Education

B.Tech., Mechatronics | Manipal University Jaipur, Rajasthan | Last Sem GPA: 9.42 | CGPA: 8.44

Class XII | CBSE, Indraprastha World School, Delhi | Percentage: 85.4% 2022-23

Class X | CBSE, Indraprastha World School, Delhi | Percentage: 84.1% 2020-21

Experience

1. **Head, Projects and Research, ACM SIGBED Chapter** – Mentored and supervised student research in embedded and cyber-physical systems (2024-25).
2. Delivered student-led lectures on **MATLAB Simulink** and **PID control systems** (2025).
3. Selected for **Erasmus+ research exchange program** (2025-26).

Patents & Research

1. **Smart Parcel Box** project as **Intelligent Parcel Delivery Box with Authenticated Access and Theft Detection System** — Patent published in India (Application No. [202511076582](#)) and granted in Germany (Patent No. [202025104999](#))
2. **Indo-German Challenge for Sustainable Production of Photovoltaic Modules**, funded by **Erasmus+ Program**
 - Selected to represent **Manipal University Jaipur** in a **collaborative research program** with **Technische Universität Braunschweig (Germany)** under the Erasmus+ initiative.
 - Engaged in research on **sustainable fabrication methods and performance optimization** of photovoltaic (PV) modules for enhanced energy efficiency and durability.
 - Collaborating with international teams to develop **eco-friendly manufacturing strategies** aligning with global renewable energy and sustainability goals.

Projects

1. [Fixed-Wing UAV Development](#) 2024
 - Built a **Trainer RC plane**, applying aerodynamics and electronics integration for stable flight.
 - Integrated **1000kv brushless motor**, **SG90 servos**, **3s LiPo battery**, and a **Flysky transmitter-receiver system** for remote-controlled operation.
 - Conducted **ground testing**, ensuring **structural integrity**, **weight balance**, and **control responsiveness** for future flight trials.

2. [Digital Timer using 8051 Microcontroller](#) 2024
 - Designed and implemented a **countdown timer** using the AT89S52 microcontroller with a **4-digit 7-segment display** and **multiplexing techniques** for efficient output control.
 - Integrated **TTP223 touch sensor** for modern touch-based start/stop functionality and **push buttons** for precise minute/second adjustments.
 - Developed software in **C using Keil uVision IDE**, incorporating **debouncing mechanisms** for reliable user input and a **buzzer alarm system** for countdown completion.
 - Ensured **high timing accuracy (<1% deviation)** with a **12 MHz crystal oscillator**, optimized **power efficiency**, and conducted **extensive testing** for stability and performance.

3. [Smart Parcel Box](#) 2025
 - Designed a fully functional smart parcel box in **Fusion 360** and fabricated using **PLA+** on a **Creality 3D printer**.
 - Powered by an **ESP32**, it includes a **barcode scanner**, **keypad**, **IR sensors**, **vibration sensors**, and a **locking mechanism** for secure parcel delivery.
 - Features **barcode scanning for parcel authentication**, **auto-locking**, **OTP display**, **theft detection**, and **Wi-Fi-enabled notifications** using **Blynk IoT** app, integrating real-time tracking and smart access control.

4. [Go-to-Goal Mobile Robot \(Mentor Funded Project\)](#) 2025 - Present
 - Designed and built an autonomous robot using **Arduino**, **MPU6050**, and **encoder-based TT motors** for dead-reckoning motion.
 - Used **Bluetooth (HC-05)** to input target coordinates and optional way point coordinates, enabling the robot to navigate in the X-Y plane from an initial origin point (0,0).
 - Implemented Polar Coordinate control to drive the robot from one coordinate to another in a smooth trajectory and cascaded along a PID controller to implement the desired wheel velocities given by the Polar Coordinate controller.

5. [Gear Test Rig \(University Funded Project\)](#) 2025 - Present
 - Developing a novel test rig for evaluating the **torque capacity**, **efficiency**, and **failure limits** of mechanical gears.
 - Designed, assembled, and simulated all mechanical components using **Autodesk Fusion 360** with dynamic motion analysis.
 - Currently overseeing **fabrication and electronics integration**, including sensor instrumentation and data acquisition for automated testing and analysis.

6. [Ornithopter: Bio-Inspired flapping wing drone \(University Funded Project\)](#) 2026
 - Designed and developed a bio-inspired ornithopter replicating avian flapping-wing flight using a crank–rocker four-bar linkage and custom 55:1 reduction gearbox for efficient wing actuation.
 - Modelled and validated the complete mechanism in Autodesk Fusion 360, including kinematic simulation, motion analysis, interference checks, and lightweight structural optimization.
 - Engineered lightweight airframe and transmission components using FDM 3D printing (PLA+ and PETG), carbon-fiber reinforced Mylar wings, and phase-balanced flapping architecture for vibration reduction.

- Achieved stable 4–6 Hz wingbeat operation with >85% drivetrain efficiency during prototype testing, while conducting structural, endurance, and aerodynamic performance evaluation.

Honours & Awards

- **3x Dean's List Award:** For scoring 9.24/10 GPA in IVth semester, 9.67 GPA in Vth semester and 9.42 GPA in VIth semester
- **2nd Position in Department's Project Expo:** For Smart Parcel Box

Technical Skills

- **Embedded Systems:** 8051, Arduino, ESP32, Sensors & Actuators, Keil μ Vision
- **CAD Modelling:** Fusion 360, AutoCAD
- **Programming:** C, Embedded C, Python
- **Simulation & Modeling:** MATLAB, Simulink
- **Electronics:** EasyEDA, Circuit Design, Debugging

Core Strengths

- **Problem-Solving & Critical Thinking**
- **Project Management and Team Leadership**