Joy Chaudhary

B.Tech Mechanical Engineering, Manipal Institute of Technology

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Profile summary

Final-year B.Tech Mechanical Engineering student with hands-on experience in precision manufacturing, rapid prototyping, and structural design. Skilled in quick CAD-to-prototype development, additive manufacturing, and metal fabrication, with proven success in designing and building complex mechanical systems under tight timelines. Experienced in design, welding, and fixture development for high-precision assemblies. Strong background in Directed Energy Deposition (DED) additive systems, electric and combustion race car chassis optimization, development of testing equipment, vacuum technology and thin films.

Skills

Design & CAD: CATIA V5 (design,technical drawings, sheet metal, ergonomic assessment), SolidWorks, Fusion 360, Creo, AutoCAD, Blender (animation & visualisation), Fixture design, Sheet metal design, GD&T.

Manufacturing & Prototyping: Additive manufacturing (polymer & metal, incl. DED), CNC machining (3-axis milling, turning), TIG welding, Composite layup, Metal fabrication, Sheet metal fabrication, .

Simulation & Analysis: FEA in ANSYS & HyperWorks , MATLAB , Python scripting.

Testing & Validation: Low-velocity impact testing for composites, Experimental chassis torsional stiffness rigs, Non-destructive testing (in progress), UTM.

Specialized courswork: Vacuum technology and thin films (1 semester long), MEMS and Nano Technology (On going).

Achievements

- **3rd Overall**, Formula Bharat 2025 — First EV debut; Full score in Structural Design; 2nd in Engineering Design.
- **4th Overall**, Formula Bharat 2024 — Combustion category; 1st in Cost & Manufacturing.
- **National Winner**, Smart India Hackathon 2022.
- **Young Scientist Awardee**, IIT Madras Innovation Competition 2022.

Experience

Research Intern, Laboratory of Advanced Manufacturing & Finishing Processes, Indian Institute of Science, Bangalore

May 2025 – July 2025

- Designed and fabricated a novel delta-configuration (DED) laser and powder based metal additive manufacturing platform. Under the mentorship of Dr. Koushik Viswanathan. 3D printer
- Performed workspace analysis (MATLAB), static structural analysis, modal analysis of the machine, and implemented synchronized 5-axis motion control.
- Designed and manufactured all mechanical parts on site using institute CNC milling and turning resources; Used CAM software for all machined components.
- Integrated and calibrated a precision powder feeder.
- Completed design, manufacturing, integration and testing in 2 months.

Manufacturing & Structures Head, Formula Manipal (Formula Student)

July 2023 - February 2025

- Led the manufacturing of a Formula student electric race car, ensuring high standards of safety and performance. Successfully aided the transition of the team from combustion to electric category, overseeing the manufacturing and structural design of the 2024-25 electric race car.
- Performed FEM-based structural design and optimized stiffness-to-weight; validated results using a custom torsional stiffness rig and dial gauges.
- Designed fixtures for chassis and subsystems (suspension, pedal box, steering, powertrain) focused on precision alignment, ease of assembly and welder accessibility, the fixtures improved assembly and manufacturing time significantly compared to previous years. They were designed to constraint 90+ tubes.
- Chassis modelled and detailed in CATIA V5 (tube notching, technical drawings); RULA ergonomic assessment performed using CATIA tools.
- Served as lead welder for both combustion and electric chassis build.
- Assisted composite layup, vacuum bagging and final packaging of assemblies into chassis.
- Designed and manufactured a dedicated EV test bench for subsystem validation prior to integration.

Low-Velocity Impact Testing Machine

February 2025 - May 2025

- Designed and built a drop-weight impact rig with calibrated mass and adjustable drop height to evaluate composite panels per ASTM-like procedures.
- Implemented precision guide rails, custom impactor, Load cell, automatic hoisting mechanism and sample holding mechanism ; Machine now used by the department and FS team for repeatable impact testing.

Rotary Braille Interface

2022 - 2023

- Built a novel braille display incorporating rotating disc tactile display; modular and simplified design.
- Project awarded IIT Madras Kriative Award 2022.

Education & training

B.Tech, Mechanical Engineering	Manipal Institute of Technology, Manipal, India .	*2022-26*
Intermediate / +2	Army Public School, Delhi 89.4%	*2022*
High School	Army Public School, Delhi 87.16%	*2020*