

VARSHITH BALA

EDUCATION

Indian Institute of Technology (BHU), Varanasi	2024 - 2028
Bachelor of Technology in Mechanical Engineering	9.46
Pace Junior Science College, Chembur	2024
MSBSHSE	93.00%
Atomic Energy Central School 2, Anushaktinagar	2022
CBSE	93.40%

INTERNSHIPS

Indian Institute of Technology, Delhi	May 2026 - July 2026
Research Intern	Delhi, India
Explored, implemented, and evaluated Baumgarte Stabilization , Gear-Gupta-Leimkuhler Stabilization , Ascher Projection , and Coordinate Partitioning methods for solving Differential Algebraic Equations (DAEs) in a constrained double pendulum system. Also, explored and implemented multiple implicit and explicit time integration schemes for Ordinary Differential Equations (ODEs) , evaluating their numerical stability , convergence , accuracy , and computational efficiency .	

PROJECTS

Processing of Tungsten Heavy Metal Alloys	Jan 2026 - Apr 2026
- Engineered functionally graded kinetic energy penetrators via Cold Isostatic Pressing (CIP) of tungsten alloy powder at 2000 bar into concentric core-shell geometries. - Developed a custom isotropic composite mould using liquid silicone rubber and fumed silica. - Validated powder compaction using the Drucker-Prager-Cap (DPC) model in ABAQUS with 2D-axisymmetric elements. - Executed a double-CIP strategy, partial core compaction followed by shell compaction, achieving green density of 11.67 g/cc.	
Drone stabilizer and flight controller	Nov 2025 - Dec 2025
Inter IIT Tech Meet 14.0 - Developed onboard state estimation pipeline for a GPS-denied nano drone using a 6-state Extended Kalman Filter fusing IMU, opticflow, ToF, and barometer. - Implemented a discrete micro-movement mode for precise 15 cm stick-triggered translations. - Built fallback logic that detects opticflow dropout or noisy ToF readings and automatically shifts between IMU-dominant or barometer-dominant estimation to maintain stable hover.	
Inventory Management Rover	Nov 2025 - Dec 2025
Inter IIT Tech Meet 14.0 - Designed an autonomous mobile robot to navigate warehouse and perform automated inventory scanning of storage racks. - Built a 4 stage cascading lift mechanism capable of achieving 175 cm vertical reach with ± 2 cm positioning accuracy. - Developed a X-type Mecanum wheel holonomic drive for omnidirectional motion to navigate warehouse aisles. - Fused wheel odometry with IMU data via Extended Kalman Filter for position estimate for SLAM and navigation, and implemented closed-loop PID control on dual Raspberry Pi Pico for drive kinematics and lift actuation.	
Live Coordinate Gesture Shooter	Github Jul 2025 - Aug 2025
- Designed and built a gesture-controlled robot using OpenCV, with real time control of movement and shooting through simple hand gestures. - Designed control logic that maps index finger to fix the target and thumb to index finger distance to set projectile velocity for the shooting mechanism. - The backend architecture included Raspberry Pico, which drove multiple servos to execute the corresponding directional and shooting actions.	

SKILLS

Programming: Python, C/C++, Mathematica, ROS, Arduino
Design & Modeling: AutoCAD, Fusion 360, SolidWorks, Inventor, GeoGebra, Additive Manufacturing
Simulation & Analysis: Ansys, Abaqus, MATLAB, Simulink, Gazebo

POSITIONS OF RESPONSIBILITY

Technex
Event Executive
Served as an Event Executive for RoboWars , coordinating event operations and ensuring smooth execution of the competition.

ACHIEVEMENTS

Secured **3rd position (Bronze medal)** in the Low Prep Problem Statement by Drona Aviation at Inter IIT Tech Meet 14.0.
Secured **2nd Runner-Up position** in the **Bajaj OHM 2026 In-Campus Hackathon**.