

Education

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•Birla Institute of Technology, Mesra

*Bachelor of Technology in Mechanical Engineering*

Aug 2023 – Present

CGPA: 8.34 / 10

Industry & Research Experience

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- Indian Institute of Technology (IIT), Delhi

*Research Intern – Dept. of Mechantronics Engineering (Advisors: . Prof. Jitendra P. Khatait, Dr.Deepak Kumar, )*

New Delhi

– Designed a low-cost, tendon-actuated 4-DOF robotic end-effector for minimally invasive surgery inspired by the da Vinci EndoWrist architecture; derived closed-form forward/inverse kinematics for a branched wrist mechanism and verified workspace and manipulability formulas.

– Built a Simulink/Simscape Multibody control pipeline (trajectory planning, per-DOF PID control, closed-loop feedback) and an interactive MATLAB GUI simulation with live 3D linkage rendering for design verification.
- Larsen & Toubro (L&T)

*Summer Intern – Plant and Piping Engineering*

Vadodara, Gujarat

– Analysed constraint propagation and load distribution across industrial piping networks; modelled system behaviour under varying operational conditions and safety-critical design limits.

– Mapped end-to-end process workflows for equipment placement and monitoring pipelines, identifying control system dependencies and failure points across multi-stage physical systems.
- Open Robotics (ROS Ecosystem)

*Open-Source Contributor – ROS Tooling & CI/CD Infrastructure*

Remote

– Contributed file-management utilities and pipeline automation to the Open Robotics ecosystem; participated in CI/CD code reviews, improving build reliability and test coverage for ROS-adjacent tooling.

Projects

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- Closed-Loop Control of a Tendon-Actuated Continuum Robot [Link]

*Mechanism Design & Controls | Python, SciPy, OpenCV, NEMA-17 Stepper Motors, Arduino (A4988)*

Jul 2025 – Dec 2025

– Modelled large-deflection kinematics as a nonlinear BVP from the Kirchhoff rod (Elastica) model; solved via Brent’s shooting method on RK45 trajectories nested in a Newton-Raphson inverse solver, converging on tendon tensions in under 15 ms.

– Closed the loop with an ArUco marker-tracking pipeline at 30 Hz; compensated hysteresis via stepper micro-adjustments, reaching end-effector accuracy of <0.5 mm across full range-of-motion.
- Computational Synthesis of Displacement-Amplifying Compliant Mechanisms [Link]

*Structural Optimisation | Python, MATLAB, COMSOL Multiphysics*

Jan 2025 – Jun 2025

– Formulated compliant-mechanism design as SIMP topology optimisation; derived adjoint sensitivities from first principles and implemented OC updating, cutting per-epoch convergence time by over 60% vs. finite-difference methods – achieving 10× displacement amplification.

– Validated via geometrically nonlinear FEA (COMSOL) and FDM-printed prototypes; force-displacement curves deviated <5% from simulation.

Technical Skills

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Mechanism Design & Simulation:

SolidWorks, MATLAB/Simulink, Simscape Multibody, COMSOL Multiphysics, ANSYS Fluent, Nonlinear FEA, Topology Optimisation (SIMP), Adjoint Sensitivity Analysis, Forward/Inverse Kinematics, Kirchhoff Rod / Elastica BVP

Robotics & Controls:

Closed-Loop PID Control, ArUco / Optical Tracking, EKF / Kalman Filtering, Embedded Systems (Arduino, ESP32), ROS / ROS2

Programming & Tools:

Python, C++, MATLAB, OpenCV, SciPy, NumPy, Git, Docker

Mathematics:

Linear Algebra, Differential Equations, Convex Optimisation, Numerical Methods (RK45, Newton-Raphson)

Achievements & Recognition

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- Codeforces Specialist,Ranked 545 / 20,000 in Round 1043 (Div. 3) – top 3% globally

2025
- CodeChef 4-Star,Consistent top-percentile rating in competitive programming

2026

Positions of Responsibility

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- Treasurer,Robolution Club, BIT Mesra

Nov 2023 – Present
- Social Media Lead,ASME Student Chapter, BIT Mesra

Nov 2023 – Present