

# EKAM SINGH

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## Education

**Thapar Institute Of Engineering and Technology**

*Bachelor of Engineering in Mechatronics Engineering*

**August 2022 – Present**

*Patiala, Punjab*

## Experience

**Rockpecker Private Limited**

*Quality Control Engineer - Internship*

**June 2024 – July 2024**

*Mohali*

- Performed quality inspections on production pieces using precision instruments, including Trimos height gauge, interpreted production drawings to verify dimensional accuracy and compliance, and prepared detailed reports for final evaluation.
- Assisted in streamlining the production process by conducting in-line inspections of machined parts, identifying defects early (leading to modification in production), and collaborating with the production team to implement corrective actions, reducing overall defect rates.

**Vibracoustic India Pvt. Ltd.**

*CAD Engineer - Internship*

**June 2023 – July 2023**

*Mohali*

- I acquired proficiency in NX, ANSYS and Hypermesh through guidance from experienced professionals during my internship.
- Prepared technical reports and presented key insights based on the work conducted.

## Projects

**MARS Rover (Iteration 3 - Alaknanda) | SolidWorks, ANSYS, Ultimaker Cura**

**January 2024 – February 2025**

- **Robotic Arm Development:** Achieved a 27% reduction in arm weight (from 15 kg to under 11 kg) by replacing aluminium links with carbon fiber pipes and using 3D-printed bevel gears; replaced base coupler with an in-house 3D-printed worm gearbox to multiply torque and eliminate backdrivability.
- **Project Contribution and Challenges:** Contributed to executing rover tasks — IDMO, RDO, ABeX, and AutEX — by applying technical expertise and teamwork to develop a robust, high-performing system.
- **Collaboration and Mentorship:** Collaborated with a 32-member multidisciplinary team to secure runner-up at IRC 2025, gaining hands-on robotics experience and strengthening cross-functional collaboration under expert mentorship.

**7 DOF Industrial Grade Robotic Arm | Solidworks, Ender-3, Ultimaker Cura**

**March 2024 – August 2024**

- Led the design and mechanical optimization of a 7-DOF robotic arm, ensuring kinematic efficiency and suitability for palletization tasks using inverse kinematics.
- Supervised and executed the 3D printing of 20+ ABS parts on an Ender 3, maintaining precision and durability through overnight production to meet industrial-grade standards.

## Publications

**7th International Conference of The Robotics Society (AIR 2025) | Accepted**

**June 2025**

**Title - Design and Analysis of a Mars Rover with Rocker-Bogie Suspension carrying a 5-DOF Robotic Arm.**

Contributed to research on 5-DOF Robotic Arm, Rocker-Bogie length calculations, and chassis stress calculation for a multi-subsystem Martian rover, presented at a leading robotics conference.

## Leadership / Extracurricular

**Team Vice Captain**

*Team MARS, Thapar University*

**June 2024 – Present**

*Patiala, Punjab*

- **Led Cross-Disciplinary Team:** Coordinated efforts of mechanical, electronics, and software teams to design and build a Mars rover for competition, ensuring seamless integration of components and adherence to deadlines.
- **Supervised the Mechanical development** Led the design and development of a 5-DOF robotic manipulator, Rocker-Bogie, chassis for a Martian rover, ensuring precision and task readiness for IRC 2024.
- **Collaboration and Mentorship:** Worked with a 32-member multidisciplinary team and helped lead the rover to a runner-up position at the International Rover Challenge (IRC),

**Lead - Mechanical Department**

*Mechatronics and Robotics Society, Thapar University*

**June 2024 – Present**

*Patiala, Punjab*

- Supervised and guided second-year members in subsystem development and integration for the Mars rover project.
- Contributed to the design and integration of electronics systems in 5 ongoing minor projects under the MARS Society, enhancing prototyping efficiency and system reliability.

## Technical Skills

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**Fields:** Mechanical Engineering, Mechanical Design, 3D Modeling, Technical Drawings

**Languages:** C (Basics), C++ (OOPs)

**Design/Tools:** SolidWorks, NX, Creo, HyperMesh, ANSYS (Static), AutoCAD, PrusaSlicer, Cura, Microsoft Excel

**Simulation/Analysis:** FEA (Static/Dynamic), CFD (ANSYS Fluent), Stress Analysis, Topology Optimization, Torque & Gear Ratio Calculations

**Manufacturing/Prototyping:** Additive Manufacturing (FDM), DFM/DFA, 3D Printing Workflow, CAM Basics, Soldering

**Embedded Systems:** Teensy, Arduino, STM32, Sensor Integration, Motor Control (PID, PWM)

**Core Knowledge:** Robotics, CAD/CAM, GD&T

## Certifications

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- Certificate of Participation in Robotron Workshop organized by Tech Analogy.
- Certificate of Participation in RoboAi Workshop organized by MyEquation.
- Certificate of Organization for efforts in organizing the DST-SERB sponsored One Day Space Robotics Workshop

## Honors and Awards

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- 2nd Overall Position in International Rover Challenge 2025 (IRC'25) held at BITS, Goa
- Winner of RoboWars, Saturnalia'24 held at Thapar University
- Finalist at International Rover Challenge 2024 (IRC'24) held at PSG iTech, Coimbatore
- Winner of RoboWars, Saturnalia'23 held at Thapar University
- Participated in National level CBSE Science Exhibition held at Suncity School, Gurugram
- Winner of State Level CBSE Science Exhibition held at GreenLand Sr. Sec. Public School, Ludhiana