

Kushal Sosale

Third Year Undergraduate - Mechanical Engineering

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EDUCATION

Year	Qualification	Institute	CPI/%
2020 - 2024	B.Tech	Indian Institute of Technology Kanpur	8.1
2020	CBSE (XII)	Narayana PU College, Bangalore	95.6 %
2018	CBSE (X)	Narayana E-Techno School, Bangalore	91.2 %

SCHOLASTIC ACHIEVEMENTS

- Secured All India Rank **283** in JEE-Main 2020 among 1.2 million students across India. (2020)
- Secured All India Rank **2218** in JEE-Advanced 2020 among 250,000 students selected from JEE Main. (2020)
- Secured a **KVPY Fellowship** at the **Indian Institute of Science**. (2019)

SKILLS SUMMARY

- Programming Languages:** Python, MATLAB, C, C++
- Tools:** Solidworks, Autodesk Fusion 360 (*Autodesk Certified Credential*); Ansys - Fluent, Mechanical APDL, Sherlock, AUTODYN; Altair - HyperMesh, OptiStruct, AcuSolve, ElectroFlo; CNC Programming
- Soft Skills:** Communication, Time Management, Leadership, Analytical Thinking
- Frameworks:** HTML, CSS, Bootstrap, TensorFlow, Scikit-Learn

EXPERIENCE

- ITC Limited**
KITES Technical Intern (Internship) (May 2023 - July 2023)
 - Summary:** Developed and executed a **validation plan** for a proof-of-concept instrument for quality control of **Classmate notebook paper**
 - Validation:** Validated the instrument against standardized testing methods and **consumer feedback** in close collaboration with ITC's **paper products and stationery products divisions**
 - Methodology:** Developed **machine learning** models to **predict consumer preference**, with predictive accuracy as the criterion for validation
 - Model Strategy:** Refined data collection strategy and ML model selection through **study of paper and ink chemistry**
 - Quality Control:** Developed and recommended quality control guidelines for use in **current production pipelines**
 - Impact:** Realized a nearly **30% improvement in quality** of Classmate notebook paper through the developed QC protocols
- Raptee Energy Inc.** Remote
Associate Vehicle Engineer (Part-time, Contractual) (December 2021 - February 2023)
 - Thermal Analysis:** Worked on board and assembly-level thermal analysis of custom PCBs involving **thermal fatigue** and component-level **thermal failure**. Providing feedback in both **PCB design** and assembly design processes.
 - Structural Analysis - NVH:** Optimised the design of casings and mounts for PCBs and battery packs for **vibration fatigue**
 - Testing:** NVH Analysis of gearbox involved **set-up of testbench** and **correlating simulation and test data** to **calibrate FEM solver** for vibration response
- Raptee Energy Inc.** Remote
CAE Engineer (Internship) (August 2021 - November 2021)
 - Thermal Analysis:** Designed **cooling strategies** for vehicle's **motor and onboard high-voltage controllers**. Involved design of **custom heatsinks** and choice of fans.
 - Structural Analysis:** Worked on **Vibration Fatigue** analysis of gearbox and structural components. Involved evaluating multiple **mounting strategies** and design of custom **dampers** before homologation.
 - Performance:** Was offered a **part-time role** at the company for my **contributions to the product as an intern**

PROJECTS

- In-Situ Characterization of Deformation Fields in Orthogonal Cutting**
Dr. Mohit Law (Ongoing)
 - Using high-speed imaging with **Digital Image Correlation (DIC)** to analyze deformation fields in **orthogonal machining** at a sub-millimeter level
 - Deriving cutting parameters in the primary cutting zone to **analyze chip-tool interactions** and **tool wear** characteristics
 - Designing **custom orthogonal cutting tools** from carbide and high-speed steel to assess the impact of **tool wear reduction techniques**
- Analysis of Aerodynamics of a Formula 1 Car**
Self Project [Link](#) (February 2022)
 - Analysed changes in the performance of **aerodynamic elements** on Formula One cars by making changes to existing designs
 - Modelled the components using technical references and photographs from the internet and **performed CFD simulations**
 - Mainly analysed **drag, downforce and wake disturbances** and gained an understanding of how F1 teams upgrade aerodynamic components

Design of Pedal Operated Thresher

TA201 Course Project

(October 2021 - November 2021)

- Designed a pedal-operated grain thresher to aid in the harvest of food grains
- Key design goals were low **cost**, maximum **process efficiency**, low **maintenance** and **sustainable design**
- Minimised cost and maximised sustainability by optimum use of **recyclable materials** and current manufacturing techniques

Design of Autonomous Underwater Vehicle Tarang

Team AUV-IITK

(June 2021 - August 2021)

- Worked on **optimising the hull design** - shape and placement of external components using **CFD and FEA**
- Designed strategies for mounting thrusters to **reduce drag and turbulence** and equipment for safe transport of the bot

POSITIONS OF RESPONSIBILITY

Team Head - Mechanical

Team AUV-IITK

(May 2022 - April 2023)

- **Leadership:** Team head for the Mechanical subsystem, in charge of **vehicle design and manufacturing**. **Trained and managed** 12 junior members
- **Design:** In charge of all aspects of vehicle design, including **hull design, propulsion systems** and **specialized components**. Currently working on our new fourth-generation bot, which is currently in the design phase.
- **Initiatives:** Streamlined design workflows by instituting clear documentation of all design processes

RELEVANT COURSES

Thermodynamics (A)	Machine Design (A)	Energy Systems - I (A)
Manufacturing Sci. & Tech. (A*)	Nature & Properties of Materials (A)	Fluid Mechanics
Intro. to Robotics	Robot Motion Planning	Electric Vehicles
Vibration & Control	Heat & Mass Transfer	Energy Systems - II [#]
Machine Learning for Engineers [#]	Manufacturing Automation [#]	Computer Aided Engineering [#]

[#]: Ongoing