Sanskrati Agarwal

Second Year Undergraduate
Department of Mechanical Engineering
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Academic Qualifications

Year	Degree/Certificate	Institute	Performance
2023-Present	B.Tech	Indian Institute of Technology Kanpur	7.0/10
2023	Class XII (CBSE)	Dr Lokmandas Public School, Etah	95.8%
2021	Class X (CBSE)	Assisi Convent School, Etah	98.8%

Scholastic Achievements

- Secured **1st** position in **Formula Bharat 2026 Rulebook Quiz** in the **EV category** among **40+** FSAE teams in India
- Secured **All India Rank 6787** in the **Joint Entrance Exam Advanced 2023** among **1.8 lakh** shortlisted candidates
- Secured **All India Rank 4635** in the **Joint Entrance Exam Mains 2023** among **11.2 lakh** applicants
- Qualified for **Stage - II** in **National Talent Search Examination** (NTSE) among **10 lakh+** candidates in India
- Secured **State Rank 3** in **UP Genius 2017** as the youngest finalist from Class **6**, competing with students up to Class **12**

Key Projects

○ **Planetary Gear Design** | **IITK Motorsports** (Advisor: Dr. Amarendra Edpuganti) (*May'25-July'25*)

Objective	• To design a **compact, lightweight**, and **structurally reliable Planetary Gearbox** for an electric drivetrain **dual motor setup** used in a formula student car ensuring efficient transmission and compact packaging
Approach	• Calculated optimal number of **gear teeth** for the **Sun, Planet and Ring** gears using **MATLAB** model, guided by the gear ratio constraints obtained from various research papers and SAE literarure on gear theory • Developed a MATLAB model to calculate optimal **face width** using **AGMA** equations, integrating material-specific parameters - **allowable bending stress, allowable contact stress** and **safety factor constraints** • Iterated the CAD model multiple times in **SolidWorks** to **reduce weight** and optimize **space utilization** • Performed **Finite Element Analysis** (FEA) on the finalized CAD model in **ANSYS** to evaluate **stress distributions** and **overall structural integrity** of the gearbox when subjected to real-world load conditions
Result	• Manufactured **final gearbox** with weight under **3.5 kg** while meeting the performance and safety requirements • Maintained a **factor of safety** (FOS) of **2.4**, validating the gearbox's structural robustness for track conditions • Contributed to the team's shift to **dual motor setup**, improving traction and drivetrain efficiency at event

○ **Quadrotor Dynamics Simulation** (Mentor: Prof. Dipayan Mukherjee) (*May'25-Present*)

- Conceptualized complete set of **ODEs** for a quadrotor system, by incorporating thrust, drag, torque, and aerodynamic effects
- Implemented **MATLAB** simulations to model **Vertical takeoff and landing** (VTOL) behavior of a quadrotor system, analyzing real-time flight trajectories, incorporating variable lift forces in order to determine the equilibrium hover conditions

○ **YouTube Analytics and Content Trends** (Finlatics Data Science Program) (*Dec'24-Feb'25*)

- Conducted analysis on a large YouTube dataset using **Python**, utilizing **NumPy** and **Pandas** to extract insights on trends such as subscribers gained, video uploads, revenue gained, and creator demographics across multiple countries and categories
- Created visualizations by using **Matplotlib** to discover trends like subscriber growth and channel creation patterns over time
- Built **Python scripts** to analyze data from scratch - gaining hands-on experience in working with real-world messy datasets

Positions of Responsibility

○ **Senior Technical Member (Powertrain)** | **SAE IITK Motorsports** (*Mar'25-Present*)

TECHNICAL

- Designed a **dual-motor rear-wheel-drive** system with integrated **torque vectoring** model to boost traction, enhance cornering and **planetary gearbox** ensuring compactness and weight reduction leading to increased efficiency of the drivetrain
- Optimized **gear ratios** using **MATLAB** and **OptimumLap** to achieve a balance between **acceleration** and **peak speed**
- Selected **motors, motor controllers**, and **components** using **co-factor matrix** consisting of weight, cost, and performance
- Designed **powertrain assembly** ensuring robust motor mounting, efficient power transmission, and integration with chassis

MANAGEMENT

- Conducted **introductory lecture** on **Powertrain subsystem overview** for the freshers batch, drawing **450+ attendees**
- Received **250+** student applications from the freshers batch for the **junior team recruitment test** for the tenure 2025-26
- Organized **written test** and shortlisted the candidates for **interviews** and **succesfully recruited 44** junior team members
- Developed and implemented **powertrain subsystem timeline**, ensuring targets are met timely for achieving team's goals
- Mentored **6 junior team members**, effectively transferring **design knowledge** of components in the powertrain subsystem
- Collaborated in team's **brainstorming sessions** to ensure efficient **project planning** and **management** within the team

○ **Secretary (Content Writing)**| **Chess Club, IIT Kanpur** (*June'24-May'25*)

- **Authored** informative **articles, emails, and social media posts** promoting chess events across the campus community
- Facilitated **registration** for various college teams across India for the tournament- **India Collegiate Chess Championship Fall 2024**, hosted by **Chess.com**, thereby ensuring smooth coordination and successful participation of all registered teams
- Collaborated with club leadership to **organize** and **execute events**, maintaining smooth coordination and communication

Technical Skills

- **Programming Languages:** C, C++, MATLAB, Python, HTML, CSS, Javascript, SQL, LaTeX, Arduino
- **Software and Libraries:** Fusion360, Solidworks, AutoCAD, Ansys, MATLAB, Optimum Lap, Matplotlib, NumPy, Pandas

Relevant Courses

Dynamics	Mechanics of Solids
Thermodynamics	Primary Manufacturing Processes
Nature and Properties of Materials	Fluid Mechanics
Theory of Mechanisms and Machines	Fundamentals of Computing
Introduction to Electronics	Complex Variables
Linear Algebra	Partial and Ordinary Differential Equations

Extra-Curricular Activities

- Secured **3rd Rank** in Uttar Pradesh among 1000+ candidates in the Inter-State tournament- **Anuvrat Essay Writing Competition (2017)**, showcasing my excellence in creative expression, English literature, and written communication skills
- Secured **Gold Medal** in **Chess** at **Fresher's Inferno**, the **Inter-Hall competition**, demonstrating my competitive spirit