



Akshaj  
Energy Science and Engineering  
Indian Institute of Technology Bombay

22B1527  
B.Tech.  
Gender: Male  
DOB: 07/12/2003

Examination	University	Institute	Year	CPI / %
Graduation				
Intermediate				
Matriculation				

Pursuing a Minor in **Entrepreneurship** offered by the **Desai Sethi School of Entrepreneurship**

## SCHOLASTIC ACHIEVEMENTS

- Secured **99.28 percentile** in JEE Advanced among **155 thousand** candidates [2022]
- Attained **99.60 percentile** in JEE Mains among over **1 million** candidates [2022]
- Among **top 264** in **Indian Olympiad Qualifiers in Astronomy** to qualify Part II [2022]
- Secured a rank of **2921** in **KVPY 2021** and listed in the Extended Merit List [2022]

## PROFESSIONAL EXPERIENCE

**Regulatory & Policy Intern, Energy & Power** | Center for Study of Science, Technology & Policy [Jul'24-Present]

- Preparing steps for **Indian States** to be **Resource Adequacy** compliant while **optimizing capacity expansions**
- Studied the **CEA Resource Adequacy Guidelines & other recent reports** of implementation in the world
- Using simulation tools such as **GridPath** for analyzing performance indices such as **LOLP & NENS**

## PROJECTS

### Major Projects

**Electricity Transition Plan for Karnataka** [Apr'24]

Course Project | Course: Energy Transition (Centre for Policy Studies) | Instructor: Prof. Anjali Sharma

- Used a method similar to **Multi-Criteria Decision Analysis (MCDA)** to rank five different energy sources
- Simulated three scenarios **Business-as-Usual, Carbon Offsetting & Direct Air Carbon Capture (DAC)**
- Found DAC alone to cost **120% of capacity expansion** for power sector to return to **2014 CO<sub>2</sub>e level by 2040**

**Matsya, Autonomous Underwater Vehicle (AUV)** [Feb'23 - Present]

*Project Guide: Prof. Leena Vachhani, Department of System and Control, IIT Bombay*

- All-student team designing & developing an **AUV**, capable of performing **realistic naval tasks**
- Annually compete at **RoboSub** | Secured **8th** position in the **Final round of RoboSub 2023**
- The team's latest iteration, **Matsya 6**, got featured in **Janes**, a highly reputed defence journal

#### *Software Developer*

[Jun'23 - Present]

- Worked on improvements to the code base such as **conversion to ROS2** and implementation of **unit testing**
- Contributed to testing the vehicle for packages such as controller, mission control, localization, drivers and vision
- Contributed to the **localization package** with coordinate conversion using SciPy and quaternions

**Virtual RobotX** [Aug'23 - Nov'23]

*Surface Vehicle simulation competition | Secured 7th position in the AUV-IITB's maiden attempt*

- Implemented **artificial potential field guided (AFG) path planning** into the controller used across tasks
- Coded the ROS package for **acoustics-related task** from scratch

### Other Projects

**Demand-Side Management** [May'23]

Course Project (Seminar) | Energy Engineering Fundamentals | Instructor: Prof. Shireesh B. Kedare

- Presented a review paper from the **University of Lancaster** on the use of **DSM techniques in Smart Grids**
- Delineated on the challenges of **Demand Response, Distributed Energy Resources & Storage Technologies**
- Elaborated on a reference that proved **17% peak demand reduction** with **agent-based decentralized controllers**

**Redox Flow Batteries & Solid-state Cells** [Jun'23-Jul'23]

Reading Project | Summer of Science | Maths & Physics Club

- Performed a **literature review** on the construction, applications, and future improvements for the 2 cell types
- Elaborated on **lithium-metal solid-state cells** under study that is **less prone to dendrite-penetration**

Wave Rectifier with C-Filter

[Apr'24]

Course Project | Course: Power Electronics | Course Instructor: Prof. Ravi Prakash Reddy

- Tested the FWR with C-filter on parameters like **ripple voltage, current peaks, & conduction interval**
- Simulated the **circuit on PLECS** for comparative analysis that found **significant parasitic reactance**

Smart India Hackathon | Top 30

[Sep'23 - Oct'23]

Problem Statement: Identification of persons from 50-100m elevations

- Finished at the **top 30 teams at the institute level** by including elements such as thermal cameras.

Options Pricing Model

[Jun'23 - Jul'23]

Finsearch | Finance Club, IIT Bombay

- Examined the mathematics of **the Black-Scholes Model and the Monte-Carlo Simulations**
- Simulated an option's price for a day using Black-Scholes Model using public data from NSE

POSITIONS OF RESPONSIBILITY

Energy Club, Secretary | Institute Technical Council, IIT Bombay

[Mar'24-Present]

- Heading an eight-member team that hosts events concerning clean and affordable energy & climate action
- Creating opportunities for students by conducting **symposiums, competitions and field visits** among others
- Conducting a **climate action themed podcast No Planet B** with academicians, professionals & activists

Policies & Projects Convener | Sustainability Cell, IIT Bombay

[Nov'23 - Feb'23]

- Compiled the **Institute Sustainability Report** featuring institute activities pertaining to the **UN SDGs**
- Compiled a comprehensive list of competitions, certifications & roadmaps into a primer **Sustainability Guide**
- Hosted **recorded interviews with professionals** to shed light on career paths in the sustainability sector

Department Academic Mentor | Student Mentorship Program

[June'24-Present]

- Responsible for academic and general counsel for a group of six sophomores of the same department
- One among seven students in the department chosen after a rigorous round of interviews

TECHNICAL SKILLS

Programming Languages

Python, Java, C/C++, git, ROS, Dart, Bash

Python Libraries

SciPy, NumPy, Pandas, Matplotlib, Vpython

Softwares

Fusion 360, LaserCAD, Fracktory, Blender, L<sup>A</sup>T<sub>E</sub>X

KEY COURSES UNDERTAKEN

Energy

Power Electronics, Electrical Machines, Reactions for Energy,

Engineering

Fluid Mechanics & Heat Transfer, Material Science for Energy

Policy

Energy Transition (Policy Studies), Economics