Aishwarya Chourasiya | **22B2114**
Mechanical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Female**
DOB: 10/01/2004

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2026	
Intermediate	HSC	B.U. Jr. College of Science, Akola	2022	93.83%
Matriculation	SSC	Jubilee English High School, Akola	2020	98.60%

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Scholastic Achievements

- Attained a percentile of **99.32** in **JEE Mains**, ranking within the top **0.6%** among **1 million+** candidates *('22)*
- Achieved a percentile of **99.94** among **0.28 million +** candidates who participated for the **MHT-CET** exam *('22)*
- Qualified **START - Antariksha Jigyasa** examination conducted by **Indian Space Research Organisation** *('23)*
- Secured a perfect grade point of **10** in **8** courses, including Fluids Lab, Engineering Mechanics, and Makerspace *('24)*

Technical Experience

Extension Actuator for Kirigami Metamaterials | Research Project *(May'24 - Jul'24)*

Guide - Prof. R. Ganesh | Department of Mechanical Engineering | IIT Bombay

- Automated the **Eigenvalue Buckling** analysis for parametric study of **100+** configurations in **Ansys** using **Python**
- Conducted **UTM** tests on **8** varied configurations to validate simulation results and obtain data for actuator sizing
- Designed the **ball screw mechanism** to study the behaviour of elastic structure using **Laser Doppler Vibrometer**

Hybrid Electric Vehicle Transmission Sizing | Summer Internship *(May'24 - Present)*

Guide - Prof. V. S. S. Pavan Kumar Hari | Electrical Machines & Power Electronics Systems Lab | IIT Bombay

- Gained knowledge of HEV powertrain component **sizing**, vehicle **longitudinal dynamics**, and **control** strategies
- Developed an **EV** powertrain model in Simulink, incorporating **SOC** estimation and sized it to meet specified load
- Working on **powertrain sizing** and precise controls for Series Hybrid Electric Vehicles using MATLAB and Simulink

Formula Student | IIT Bombay Racing Team

Faculty Advisor - Prof. Sandeep Anand | Department of Electrical Engineering | IIT Bombay

A 3-tier cross-functional team comprising of 70+ students who design and fabricate a Formula-style electric race car

Mechanical Subdivision Member | Chassis and System Integration subsystem *(Aug'23 - Apr'24)*

- Designed sys-int boxes (**Dash** and **Energymeter**) to securely house and seamlessly integrate electrical components
- Contributed in preparing the **SES** for FS 2024 season underlining the structural strength of the **composite chassis**
- Engineered **a full-scale mock chassis** for the upcoming E14 race car design ideation, enhancing driver ergonomics
- Recruited and assessed trainees through conceptual questions on **race car engineering** to foster team excellence
- Created a comprehensive subsystem training module to **mentor** trainees in mastering fundamentals of the subsystem

Mechanical Trainee | Structural subdivision *(Jun'23 - Aug'23)*

- Gained insights into theoretical aspects of **Chassis and System Integration**, **Aerodynamics** and **Composites**
- Analyzed the incompressible fluid flow over Ahmed's Body in **Ansys Fluent** using the **k-epsilon** turbulence model
- Studied the nomenclatures of **airfoils** and designed aerodynamic **rear wing** of a Formula race car in SolidWorks

Key Projects

Simulation and Autopilot Design for UAVs *(Mar'24 - Apr'24)*

Guide - Prof. Shashi Ranjan Kumar | Course Project: Guidance and Control of Unmanned Autonomous Vehicles

- Applied kinematic and dynamic **equations of motion** for the UAV to ensure precise force and moment representation
- Developed MATLAB code to linearize the Simulink blocks about the trim condition producing the **state-space** model
- Designed the **lateral** and **longitudinal** autopilots and analyzed the effect of disturbances over control input signals

Six DOF Robotic Arm Computational Project *(Mar'24 - Apr'24)*

Guide - Prof. Amit Singh | Course Project: Kinematics and Dynamics of Machines

- Acquired an in-depth understanding of **inverse kinematics** applicable to a **six** degrees of freedom robotic arm
- Performed kinematic and dynamic simulations in **Solidworks**, aiding in performance analysis and design optimization
- Verified the kinematic analysis through a **Python** code and created a GUI using **PYQT** to control arm position

Autonomous Field Traversal and Plant Classification Drone *(Mar'24 - Apr'24)*

Guide - Prof. Alankar Alankar | Course Project: Applied Data Science and Machine Learning

- Implemented the **A* algorithm** for optimizing drone **path planning**, ensuring efficient and accurate traversal
- Trained **CNNs** for plant classification on a designated dataset, successfully attaining an accuracy of **95%**
- Developed **real-time object detection** in PyCharm to identify objects, calculate distances, and generate alerts

Line Follower Bot with Mechanical Obstacle Detection *(Dec'22 - Jan'23)*
Guide - Prof. Amit Singh | Course Project: Makerspace
- Designed the bot chassis using **Autodesk Fusion 360** equipped **IR sensors** with precise line-following capability
- Implemented an obstacle avoidance system using a revolute joint, controlled by **Arduino** and **L298N** motor driver
- Recognized for the innovative concept, selected among the **best 24 out of 120** teams for exceptional performance

Simulation of Metal Forming *(Mar'24)*
Guide - Prof. Amber Shrivastava | Course Project: Mechanical Processing of Materials
- Developed a **MATLAB** script to **simulate metal rolling**, analyzing effects on rolling force, torque, and power
- Evaluated effects of **friction** and **roll diameter** on rolling pressure, force, and torque by generating illustrative plots

FEA using ML | Seasons of Code | Web and Coding Club | ITC *(May'24 - Jul'24)*
- Studied **Finite Element Analysis** techniques for structural analysis and simulation in engineering applications
- Developed a **Python** script to analyze intricate trusses, computing displacements at free nodes and support reactions
- Studied a beam model, focusing on dimensionality reduction techniques like **GNN** and **PCA**, and their application in regression methods for model comparison, highlighting key findings on **error reduction** and **variance** capture

Machine Design | Summer of Science | Math and Physics Club | ITC *(May'24 - Jul'24)*
- Explored **DFMA** principles in **product development** to optimize product design and manufacturing efficiency
- Learnt analysis of mechanical components: fasteners, shafts, joints, bearings, belt drives, pressure vessels, and brakes

Chemical Processing Plant Optimization via Predictive Modeling *(Nov'23)*
Guide - Prof. Vinay Kulkarni | Course Project: Programming for Data Science
- Executed detailed **Exploratory Data Analysis**, resulting in a refined dataset for advanced predictive modeling
- Implemented **Random Forest** and **Multiple Linear Regression** models to identify critical factors influencing equipment vibrations and specific energy consumption, achieving a high **R-squared** value of **0.9967** for prediction
- Identified key parameters using **correlation ranks** and **feature importance** ensuring robust predictive model

Stock Data Analysis *(Sep'23)*
Guide - Prof. Vinay Kulkarni | Course Project: Programming for Data Science
- Carried out stock price data analysis using **Pyspark**, **MySQL**, DataFrames in Pandas, and Pivot Tables in Excel
- Learnt multiple regression and classification techniques judged by quality parameters such as **F1 score**, **p-value**, etc

Innovative Fitness Solutions *(Jan'24 - Apr'24)*
Guide - Prof. Nishant Sharma | Course Project: Design Thinking for Innovation
- Pitched a retractable **treadmill-cum-cycle** combination model to the panel, designed to address space constraints
- Designed a **UI** in **Figma** to visualize real-world sports, incorporating analytics and feedback for **VR headset** users

Positions Of Responsibility

Interview Coordinator | Placement Cell | IIT Bombay *(Dec'23)*
- Effectively coordinated with a collaborative team of **250+** members to conduct interviews for over **2000** students
- Assisted in conducting tests for **20+** firms, handling student queries, and ensuring a flawless and organized process

XLR8 Mentor | Electronics and Robotics Club | ITC *(Aug'23 - Sep'23)*
- Guided **three** student groups designing and optimizing efficient, stable, and maneuverable **IMU**-controlled bots
- Mentored on best design practices, fostering success in **XLR8**, **Mars Rover Team**, and **AUV-IITB** challenges

Technical Skills

Softwares	SolidWorks, Ansys(Structural and Fluent), MATLAB, Simulink, Simscape, DBeaver, GitHub
Programming	C/C++, Python (Libraries: Numpy, MatplotLib, Pandas, PySpark), SQL, Arduino-IDE
ML Libraries	Tensorflow, PyTorch, Keras, OpenCV, SKlearn, Seaborn

Key Courses Undertaken

Mechanical Engineering	Engineering Mechanics, Thermodynamics, Fluid Mechanics, Solid Mechanics, Structural Materials, Manufacturing Processes, Kinematics and Dynamics of Machines, Heat Transfer*
System and Controls	System Modelling, Dynamics and Control, Guidance and Control of Unmanned Autonomous Vehicles, Microprocessor and Automatic Controls*
Programming and ML	Introduction to Machine Learning, Applied Data Science and Machine Learning, Programming for Data Science, Computer Programming and Utilization
Mathematics	Calculus, Linear Algebra, Differential Equations
Certifications	**Coursera**: Aerial Robotics, Supervised Machine Learning; **Mathworks**: MATLAB, Simulink, Machine Learning, Simscape, Control Design, Simscape Battery, Power Electronics Simulation

*(*Ongoing, to be completed by Nov'24)*

Extracurriculars

- Earned the prestigious title of **Miss Mechanical** at Mech Cultural Night for excellence in fashion modeling *(Feb'24)*
- Completed one year of intensive training of **80+** hours in **Hockey** under the **NSO** program at the institute *(Apr'23)*
- Represented freshers in fashion modeling at the **Mechanical Traditional Day** before an audience of **600+** *(Feb'23)*
- Successfully passed the **Elementary Drawing Examination** administered by the Gov. of Maharashtra *(Sep'17)*
- Qualified with distinction in the first-level examination of **Abacus** and **Mental Mathematics** proficiency *(Apr'17)*