Aaditya Gupta   22B3941

Electrical Engineering   **Dual Degree (B.Tech. + M.Tech.)**

Indian Institute of Technology Bombay   **Gender: Male**

Specialization: Microelectronics and VLSI   **DOB: 06/06/2004**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2027	
Intermediate	ISC	Hiranandani Foundation School, Thane	2022	98.20%
Matriculation	ICSE	Smt. Sulochanadevi Singhania School	2020	98.50%

Pursuing a **Minor** degree in **Computer Science and Engineering**

SCHOLASTIC ACHIEVEMENTS

- Secured **Department Rank 12** amongst 100+ students in the Electrical Engineering Dual Degree Department.   *('24)*
- Secured **AA grade** in *Microprocessers, Power Engineering, Analog Circuits* and *Computer Networks* courses   *('24)*
- Achieved **All India Rank 843** in the *JEE Advanced* examination amongst **1 lakh+** eligible candidates   *('22)*
- Secured **All India Rank 152** (*99.989 percentile*) in the *JEE Main* examination among **8 lakh+** candidates   *('22)*
- Secured **AIR 801** (*SA*) and **AIR 512** (*SX*) in the KVPY examination conducted by **IISc Bangalore**   *('22, '21)*
- Offered scholarship by CISCE, for placing in the **top 2%** students in the ISC class 12 board examinations   *('22)*

KEY PROJECTS

RISC Pipelined Processor Design | *EE309 Course Project* | *Guide: Prof. Virendra Singh*   *(Spring '24)*
- Implemented a **6-stage pipelined RISC** processor capable of executing **26 instructions**, based on the given ISA
- Optimised the pipeline architecture using **forwarding** and **hazard mitigation** techniques like **stalling, flushing**, etc.
- Coded the entire datapath in **VHDL** and tested and verified the working of instructions using **RTL** simulations

8051 Microcontroller Interfacing | *EE337 Course Project* | *Guide: Prof. Nikhil Karamchandani*   *(Spring '24)*
- Designed and implemented a clock pulse generator, an adder and a 2x2 matrix multiplier in **Assembly language**.
- Built a **PT - 51 microcontroller** based musical keyboard and regression based predictor using **Embedded C**
- Interfaced **MCP3008** 10-bit ADC and **UART** module using **Realterm** software for establishing serial communication

Digital Circuit Design | *EE214 Course Project* | *Guide: Prof. Siddharth Tallur*   *(Autumn '23)*
- Designed and implemented digital circuits like ripple-carry adder-subtractor, sequence generator, FSM, BCD adders and Arithmetic Logic Units (ALU), etc. in **VHDL** using **structural, behavioural** and **dataflow modelling**
- Performed **RTL** simulations on the above circuits using generic testbenches in the **Intel Quartus Prime** software
- Utilised **UrJTAG with ScanChain** to test circuits on the **Altera MAX X CPLD** board developed at IIT Bombay

Digital Processor Design | *EE224 Course Project* | *Guide: Prof. Virendra Singh*   *(Autumn '23)*
- Used **Intel Quartus** and **VHDL** programming to design a multicycle CPU, which was based on a finite state machine
- The CPU was capable of executing **14 commands** like addition, multiplication, load, store etc. on two 8 bit numbers
- Performed **RTL** simulations and extensive testing on the **Altera MAX X CPLD** board developed at IIT Bombay

Computer Architecture | *Summer of Science '24*   *(Summer '24)*
- Completed the **ELE 475** semester course on Computer Architecture, offered by **Princeton University**
- Studied about **Superscalar, VLIW and Vector processors, Multithreading, GPUs** and **Multiprocessor** systems
- Documented a **100 page report** on topics like **branch prediction, cache coherence protocols** and **memory management**

Analog Circuit Design | *EE230 Course Project* | *Guide: Prof. Anil Kottantharayil*   *(Spring '24)*
- Designed **active filters, differential** and **logarithmic amplifiers** using **LM741** and **TL084** OpAmp ICs and **MOSFETS**
- Implemented an **ECG Amplifier**, which shows real-time electrical signals corresponding to heart beats on the DSO
- Designed and simulated circuits in **LTSpice** for calculating the required resistance and capacitance values

OTHER PROJECTS

Quadrocount - Online Multiplayer Game | *Season of Code '24* | *UGAC IITB*   *(Summer '24)*
- Coded a variation of the logical game Quadrocount in **JavaScript**, tested and verified the score calculation algorithm
- Worked with **Node JS** and **StreamDeck** to create a local server to make the online multiplayer mode of the game
- Designed the user interface using **CSS** comprising of authentication screens, game interface and result display

Fire Extinguishing and Obstacle Maneuvering Bot | *Makerspace (MS 101)* *(Autumn '22)*

- Used softwares like **Autodesk Fusion 360 AutoCAD**, industrial machinery like **laser cutters, 3d printers**, along with Arduino coding and analog circuitry to make a **line follower bot** which could **detect and extinguish fire**
- Used **IR sensors** to follow a line, **flame sensors** to detect flame, **L298N motor driver** to supply power from the battery to the motors and the Arduino, and **bluetooth control** for complete control of speed and direction.
- The bot was selected as one of the **best bot** created amongst 200+ other bots, each with unique capabilities.

Racing and Offroading Bot | *XLR8 Competition | Electronics & Robotics Club* *(Autumn '22)*

- Used **AutoCAD, 3d printing, laser cutting** and industrial heavy machinery like **drilling machine, lathing machine, soldering station** to create a bot with powerful motors and a strong chassis, to complete a complex obstacle course
- The bot could be controlled using a mobile phone with the help of a **Wifi and bluetooth module** installed on it

SKILLS

Programming Languages	C, C++, Java, Python, LaTeX, VHDL, Embedded C, Assembly, JavaScript
Electrical Engineering	Intel Quartus Prime, Atmel Flip, Keil μVision, Realterm, LTSpice, XCircuit
Miscellaneous	HTML, CSS, Git, Autodesk Fusion 360 CAD

POSITIONS OF RESPONSIBILITY

Music Secretary | *Hostel 5, IIT Bombay* *('23 - '24)*

- Selected as one of the **22 secretaries**, out of 50+ applications, to become a part of a **3-tier council**
- Administered the maintenance of the hostel music room and inventory management of all musical instruments
- Spearheaded the band from Hostel 5 to Goonj, the Music General Championship, and achieved **first position** amongst 14 hostels, thus contributing **100** points in the hostel's winning pursuit for the **Cultural Cup 23 - 24**
- Helped other genre secretaries in organising and managing various in-hostel social events, festivals and gatherings

KEY COURSES UNDERTAKEN

Core: Electrical Engineering

Microprocessors, Electronic Devices and Circuits, Power Engineering I and II, Control Systems, Digital Electronics, Analog Electronics, Signal Processing, Probability and Random Processes, Introduction to Electrical Engineering

Minor: Computer Science

Data Structures and Algorithms, Computer Networks, Computer Programming and Utilisation

Laboratory Courses

Microprocessor Lab, Analog Circuits Lab, Power Engineering Lab, Digital Electronics Lab, Makerspace Lab

Online Certifications

Computer Architecture: Princeton University; Supervised Machine Learning: Regression and Classification; Advanced Learning Algorithms; Unsupervised Learning; Data Science Orientation; Tools for Data Science; Python for Data Science, AI and Development; Data Science Methodology; Crash Course On Python by Google; Trading Basics; Ethical Hacking Basics

EXTRACURRICULAR ACTIVITIES

Dramatics	• Part of the **winning Stage Play team**, selected out of **1000+** students representing IIT Bombay at the **Inter IIT Cultural Meet 6.0** held at *IIT Kharagpur* • Part of the **Street Play team**, selected out of **1000+** students to represent IIT Bombay at the **Inter IIT Cultural Meet 5.0** held at *IIT Madras*, and recieved **special mentions** for the performance • Awarded the **Best writer** and **Third** position in Street Play General Championship
Music	• Awarded **distinction** in the **Madhyama Poorna** examination, conducted by Akhil Bharatiya Gandharva Mahavidyalay, in **Hindustani classical singing and harmonium playing** • Part of the hostel band as a pianist and secured **first place** in the Goonj General Championship • Completed a **one year course** in **Classical music** conducted by **NSO** at IIT Bombay
Miscellaneous	• Felicitated by **Dr. Niranjan Hiranandani** for exceptional academic performance • Recieved the **A certificate** of **NCC** while being a part of the **1 MAH Air Squadron NCC** • Led a school house as **House Prefect** in high school, elected by 1500+ students