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B.Tech.  
Gender: Male  
DOB: 29/11/2003

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	

Pursuing a **Minor** Degree from Department of **Computer Science** at IIT Bombay

## SCHOLASTIC ACHIEVEMENTS

- Awarded with **AP Grade (Advance Performer)** for outstanding performance in **Signal Processing - 1** and **Basics of Electricity and Magnetism** (given to top 2% students) [2023]
- Secured **All India Rank 102** in **JEE-Advanced** among 1,40,000+ students [2021]
- Secured **All India Rank 82** in **KVPY 2021 - SX Stream**, held by **IISc, Bangalore** [2021]
- Secured **All India Rank 214** (99.986 %ile) in **JEE-Mains** out of 1.2 million candidates [2021]
- Achieved a score of **402** out of 450 in **BITSAT** examination conducted by BITS [2021]
- Among the **State Top 1%** in Indian Olympiad Qualifier in Astronomy (**IOQA**) and in Indian Olympiad Qualifier in Physics (**IOQP**) [2021]

## PROJECTS

### Pipelined RISC Processor Design

[Apr'23 to May'23]

Course Project: Microprocessors | Guide: Prof Virendra Singh

- Designed a **6 stage pipelined processor** for optimized performance for an instruction set with **24 instructions**, with complete **hazard mitigation**, and **implemented** it using VHDL as HDL
- Designed **Decoders** (including **Intruction decoder**) to generate **control signals** for various hardware components and a **hazard detector** using forwarding paths
- Wrote the **VHDL** code of the various components used and tested it in **RTL simulations**

### Microcontroller Interfacing and Programming

[Jan'23 to March'23]

Course Project: Microprocessors Lab | Guide: Prof Nikhil Karamchandani

- Used **Keil  $\mu$ Vision** for debugging, simulation and tested the generated **.hex** files on **Pt-51**
- Implemented **array sorting** techniques in assembly language for **8051 microcontroller**
- **Interfaced a keypad** with Pt-51 board to display the typed characters on a LCD Display
- Used **8051 timer interrupts** to generate square waves to play notes on speaker

### Multicycle Architecture Processor

[Nov'22 to Dec'22]

Course Project: Digital Systems | Guide: Prof Virendra Singh

- Designed a computing system, **IITB-CPU**, with a given ISA, and **implemented** it using VHDL
- Designed the **hardware components** and made a flowchart of states for each instruction
- Reduced the number of states by combining similar states in different operations
- Made a **FSM diagram** and designed a control unit
- Wrote the **VHDL** code of the **FSM** and various components used and simulated it in **RTL**

### Digital Bandpass and Bandstop Filter Design in MATLAB

[Feb'23 to March'23]

Course Project: Digital Signal Processing | Guide: Prof Vikram Gadre

- **Designed 4 IIR filters**: Butterworth Bandstop filter, Chebyshev Bandpass filter, and Elliptic Bandpass and Bandstop filters for the given filter specifications
- **Designed FIR Bandpass and Bandstop Filters** using Kaiser Window
- **Implemented** the above filter designs in **MATLAB** and verified them using plots of the transfer functions and also wrote a **report** to explain the approach behind the designs

## Digital Logic Design in VHDL

[Aug'22 to Oct'22]

Course Project: Digital Systems Lab | Guide: Prof Maryam Shojaei

- **Sequence Detector:** Designed a **Sequence Detector Mealy Machine** which detected a **alphabetical sub sequence** inside a given sequence using **Behavioural Description**
- **Arithmetic and Logic Unit:** Implemented a basic **Arithmetic and Logic unit** using Behavioural Description and Verified it using **Scanchain Mechanism on Xenon Board**
- **Sequence Generator:** Designed a sequence generator **Finite State Machine** using sequential circuit elements like **D Flip Flops** in **Structural Modelling mechanism** and verified it
- **Multiplier:** Designed a 4x3 binary multiplier using Behavioural description and verified the outputs using Scanchain mechanism on Xenon board

## Topology

[April'22 to May'22]

Reading Project | Mentor: Anurag Pendse, a 3rd year EP student at IITB

- Studied the concepts in Point Set Topology, Some Group Theory, Topological Spaces, Euler Characteristic and Homology groups and made a report summarizing the topics
- Made a **presentation** on the topic **Compact Sets**

## TECHNICAL SKILLS

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- **Programming Languages and HDL:** Embedded C, VHDL, Python, MATLAB, C++
- **Technical Libraries:** Numpy, Matplotlib, Tensorflow
- **Software Packages:** Keil  $\mu$ Vision, MATLAB, L<sup>A</sup>T<sub>E</sub>X, MS Office, Quartus, Ngspice, Xcircuit

## KEY COURSES UNDERTAKEN

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<b>Electrical</b>	• Microprocessors, Digital Systems, Digital Signal Processing, Signal Processing - 1, Communication Systems*, EM Waves*, Control Systems, Matrix Computations, Analog Circuits, Probability and Random Processes
<b>Computer Science</b>	• Discrete Structures, Computer Programming and Utilization
<b>Physics</b>	• Quantum Physics and Application, Basics of Electricity & Magnetism
<b>Labs</b>	• Communications Lab*, Controls Lab*, Microprocessors Lab, Digital Circuits Lab, Analog Lab, Electronics Devices Lab*
<b>Mathematics</b>	• Calculus, Linear Algebra, Differential Equations, Complex Analysis
<b>Online Courses</b>	• Supervised Machine Learning: Regression and Classification, Advanced Learning Algorithms

\*To be completed by Dec'23

## POSITIONS OF RESPONSIBILITY

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- **Teaching Assistant || IIT Bombay**

MA111 - Calculus II

Guide: Prof. Preeti Raman

[Jan'23 to March'23]

- Among the **36** students selected across all UG batches for teaching a class of 34 freshmen
- Catered students' course related queries and conducted weekly tutorial sessions

## EXTRA CURRICULAR ACTIVITIES

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- **Hobbies:** Playing Football and Tennis, Reading books, Listening to music
- Actively engaged in **Competitive Programming** and currently a **2 star coder** on Codechef
- Among the top Quartile students who participated in the **SMMC Maths Competition** (2022)
- **Sports:**
  - Participated in EE Sports Meet in Table Tennis Singles and Doubles
  - Participated in an year long training in athletics in NSO
- **Music:** Participating in Introductory Music Learning Program to learn to play Keyboard
- **Tech:** Participated in an event called Codewars conducted by the Web and Coding Club