Lohitaksh Mahajan
Electrical Engineering
Indian Institute of Technology Bombay

21D070042
Dual Degree (B.Tech. + M.Tech.)
Gender: Male
DOB: 01/01/2004

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2026	
Intermediate	JKBOSE	Spring Dales English School	2021	98.40%
Matriculation	JKBOSE	Spring Dales English School	2019	96.80%

Scholastic Achievements

- Achieved **Department Rank 2** out of 100+ students in Electrical (Dual Degree) with a CPI of 9.14 [2023]
- Secured All India Rank of **544** in **Joint Entrance Examination Advanced** out of **0.16 million** aspirants [2021]
- Bagged All India Rank of **194** in **Joint Entrance Examination Mains** amongst **1 million** candidates [2021]
- Obtained **100 percentile** and 100 percent marks in Mathematics section of Joint Entrance Examination Mains [2021]
- Among top **2000** students who qualified second stage of **NTSE** conducted by NCERT [2019]
- Secured **International Rank 2** in International Mathematics Olympiad conducted by SOF [2021]
- **State Winner** in Green Olympiad Examination by The Energy and Resources Institute [2016]
- **State Topper** in first stage of National Science Talent Search Examination conducted by Unified Council [2017]

Professional Experience

Impact Guru Technology Ventures Pvt. Ltd. | *Data Analytics Intern* *Dec'22 - Jan'23*

- Performed research work in support of various projects by **analyzing results using statistical techniques**
- Helped plan and design **business data processes** and make recommendations for improvements in current methods
- Assisted in resolving issues with launching new processes and initiatives in **collaboration with 100+ people**

Projects

RISC Processor Design | *Course Project*

Prof Virendra Singh | EE-309 *May 2023*

- Designed and Implemented 6 stage pipelined 16 bit microprocessor **IITB-RISC-23** in VHDL using a custom ISA
- Implemented **26 instructions** using hazard mitigation techniques such data forwarding for artithmetic instructions
- Utilized **DE0 Nano board** for comprehensive **FPGA**-based demonstration and testing of designed microprocessor

Analog Circuit Design | *Course Project*

Prof Anil Kottantharayil | EE-230 *Spring 2023*

- Designed Precision Rectifier, **logarithmic amplifier**, **Wein Bridge Oscillator**, sallen key filters and current mirrors
- Used TL084 opamp, MC14007 Mosfets and BJTs to design circuits such as filters, oscillators and current mirrors
- Calculated critical frequencies and Q factor as **605 Hz**, **800 Hz** and **3.60** respectively of an active band pass filter
- Simulated **Complete Logarithmic Amplifier** on Ngspice and designed all the above circuits virtually in XCircuit

Mini 8085 Microprocessor | *Course Project*

Prof Virendra Singh | EE-309 *April 2023*

- Designed a scaled down version of **8085 microprocessor** to implement 18 instructions using **CISC Architecture**
- Used hardware flow chart and **microcode-based architecture** method to design the **control store** of the processor
- Designed **level 2 flow chart**, datapath and controller organization, complete control words along with decode logic

BCD Subtractor | *Course Project*

Prof Maryam Shojaei Baghini | EE-214 *Autumn 2022*

- Designed a **Combinational circuit** in **VHDL** which can subtract two numbers given in their BCD representation
- Implemented a module to detect **sum greater than 9** using BCD Adder and 4 bit Adder and Subtractor
- Performed the RTL simulation using Quartus prime application and verified this using **Scan Chain application**

Arithmetic Logic Unit | *Course Project*

Prof Maryam Shojaei Baghini | EE-214 *Autumn 2022*

- Designed a **Combinational circuit** using behavioral modelling in **VHDL** which can perform given functions
- Added **Max**, **And**, **Multiply** and **Equate** functions in ALU which can be selected based on the control lines
- Performed the RTL simulation using Quartus prime application and verified this using **Scan Chain application**

8051 Microprocessor Coding | *Course Project*

Prof Nikhil Karamchandani | EE-337 *Spring 2023*

- Implemented Bubble Sort, Quantization, StopWatch, Keyboard and interfaced **USB using UART** in Keil software
- Used **Assembly and Embedded C** language to write complex programs using ISA of **8051 microprocessor**
- Simulated and verified these programs on **Pt51 Board** using Flip software and interfaced them with LCD and keypad

Keypad-Based Password Detection | *Course Project*

Prof Nikhil Karamchandani | EE-337 *Spring 2023*

- Explored the utilization and design of **4x4 keyboard** on Pt-51 board, employing keypads and ports in embedded C
- Developed an **Embedded C code** enabling the acceptance and verification of passwords from an external keypad

Analyzing Probabilities and Bias Patterns | *Course Project*

Prof D. Manjunath | EE-325 *Autumn 2022*

- Researched **two algorithms** to simulate 3 biased coins, maximizing the no. of heads with a fixed number of tosses
- Developed a **Python code** capable of simulating biased coins and identifying the coin with maximum desired result
- Utilized **Hoeffding's Inequality** to simulate biased coins and plotted graphs for maximizing the number of heads

Bubble Trouble | *Course Project*

Prof. Parag Kumar Chaudhari | CS-101 *Autumn 2021*

- Designed a **Bubble Trouble Game** in which one can shoot bullets to burst bubbles purely in C++ using simplecpp
- Incorporated the feature of **collision** and **vertical motion** using concepts from Object Oriented Programming
- Added extra features like **score and health counter**, **timer** and splitting of bigger bubble into smaller bubbles

Technical Proficieny

Programming	C, C++, Python, VHDL, Assembly Language, Visual Basic
Tools	Google Colab, LaTeX, Intel Quartus, Keil, Ngspice, SAT Solver

KEY COURSES

Electrical Engineering(Theory)	Analog Circuits, Digital Circuits, Testing and Verification of VLSI Circuits, Signal Processing, Probability and Random Processes, Microprocessor, Control Systems, Power Engineering, Electronic Devices and Circuits, Communication System*, Electromagnetic Waves*
Electrical Engineeering(Labs)	Analog Lab, Microprocessors Lab, Digital Circuits Lab, Power Engineering Lab, Communication Systems Lab*, Electronic Devices Lab*, Control Systems Lab*
Maths and Physics	Calculus, Linear Algebra, Complex Analysis, Differential Equations, Quantum Physics and Application, Basics of Electricity and Magnetism
Computer Science	Computer Programming and Utilization
Other	Engineering Graphics and Drawing, Organic and Inorganic Chemistry, Physical Chemistry, Biology, Economics, Psychology of Health, Gender in the Workplace

** To be completed by Nov 2023*

Extracurriculars

- Completed one year of training in **volleyball** under NSO (National Sports Organization), IIT Bombay [2021-22]
- Secured **first position** in Hindi Niband Writing Competition Held by Vaani Club, IITB during 2022 [2022]
- Qualified for **State Level** Project Presentation under 25^{th} National Children's Science Congress [2017]
- Achieved 4^{th} **position** in summer-zone in class 12^{th} in Jammu and Kashmir State Board of School Education [2021]