Dheeraj Shakya | **200070016**
Electrical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 01/03/2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	7.22
Intermediate	CBSE	Ebenezer Higher Secondary School, Gwalior	2020	91.20%
Matriculation	CBSE	Kendriya Vidyalaya Morena	2018	95.40%

Scholastic Achievements

- Secured **All India Rank 68** in **JEE Advanced 2020.** *(2020)*
- Secured **All India Rank 279** in **JEE Mains 2020**. *(2020)*
- Achieved **State Rank 133** in **National Science Talent Search Examination** (**NSTSE**) *(2016)*

Technical Experience

Design Engineer | *IIT Bombay Racing* *June '22 - Present*

An active team of 80 students with the goal of building an Electric Vehicle for Formula Student UK, a reputed race car design competition organized by the Institution of Mechanical Engineers

- Tenure is targeted to upgrade assigned circuit boards for robust and reliable operation while decreasing debugging period with **block-wise design** and **testing, impedance analyses, reviewing circuit designs**
- Aimed to decrease testing time by developing a **generic testbench** with each PCB having a common test connector

Junior Design Engineer | *IIT Bombay Racing* *Nov '20 - June '22*

- Designed **3 iterations** of **Tractive System Active Light (TSAL)** using **EAGLE software** in accordance to the **Formula Student rulebook**, latest iteration of which is currently running on the developed EV
- Experienced with **circuit designing, PCB board routing, quality soldering, testing** and **debugging**
- Simulated a basic **Brake System Plausibility Device(BSPD)** in **LTspice** for safe shutdown if hard braking
- Experienced with **CAD** and **Assembly Modelling** in **Solidworks**, built numerous parts for 3D-printing and laser cutting

Technical Projects

Battery Charger for EVs | *Academic Project* | *Prof Vivek Agarwal* *June '22 - Present*

- Simulated CC-CV Charging circuit in **LTspice** with **buck converter topology** for 3.7V lithium ion battery
- Implemented current-voltage sensing for CC-CV charging and Duty cycle control with **LM5117 synchronous buck controller** having current-mode control and **LM431 Adjustable Precision zener shunt regulator**
- Project currrently aimed at designing and implementing the charger in an inherently built **EV by IITB Racing Team** with a **tractive system powered upto 400V**

Digital Logic Design in VHDL | *Course Project* | *Prof. Maryam baghini* *Aug '21 - Oct '21*

- Designed mulitple combinational circuits using VHDL including 4-bit 4x1 MUX, multiplier, universal shifter, 4-bit adder subtractor, and 4-bit ALU and performed **RTL and Gate level simulations** to validate the designs
- Built sequence generator with **asynchronous reset** using **structural** and **behavioural modelling** in VHDL
- Extended the sequence generator to implement a **Mealy type FSM** onto a **CPLD-Krypton board** to detect word "covid" and display the output on an **LCD module**

Digital Phase-Meter for Sine waves | *Trainee Project* | *IIT Bombay Racing* *May '21 - July '21*

- Designed and simulated a digital sine wave phase meter in **LTspice** using logic gates, comparators, 555 timers, J-K flip-flop, and ripple counter to obtain the output binary waveform for the phase value
- Further emulated the entire circuit in **Tinkercad** using **logic gates, LM393, 74HC73 (JK Flip-Flop), 74HC93 (ripple counter), CD4511 (7-segment decoder)** to show the phase value on 7-segment displays

Self-Balancing Robot | *Tinkerers' Laboratory* | *Manager* *Nov '21*

- Designed a two-wheel **PID controlled self-balancing** robot using Arduino nano and **TB6612 motor driver** for PWM speed control and **MPU6050** with **complementary filter** for the angle sensing
- Implemented wireless control using **HC-05 bluetooth transceiver** and developed a simple app in **MIT app inventor**

Analog Circuits Design & Simulation | *Course Projects* | *Prof. Anil k.* *Jan '22 - Apr '22*

- Simulated analog circuits like logarithmic amplifier, instrumentation amplifier, active and passive filters, Schmitt trigger, astable multivibrator, monostable multivibrator using **ngSpice**
- Implemented the designed circuits to test the results using various ICs and other components

Lasso Game | *Course Project* | *Prof. Bhaskaran Raman* *Feb '20 - Mar '20*

- Designed a Game Lasso using **object oriented programming** in C++ and **simpleCPP graphic library**
- Used various C++ libraries to obtain many desired in-game features such as **Randomize bomb transformation, reflection** and **randomize projection** with **variable speeds**
- Implemented live player stats display with key features of **HighScore, Response time, accuracy** and **comparison between different players**
- Handled live input from the keyboard with an user friendly interface

Spanning Tree Protocol | *Course Project* | *Prof. Varsha Apte* *Oct '21*

- Implemented the distributed simulation logic for **Spanning Tree Protocol**, loop free logical topology, in C++
- Used **OOP concepts** and data types like **vector** from the **C++ STL**, to ensure efficient implementation of the algorithm

Positions of Responsibility

InstiX Hardware Lead | *InstiX* | *GSTA* *June '22- Present*

- Leading **hardware division** of the **InstiX**, a developing community of the institute working under **GSTA** with an aim to provide **embedded system solutions** to institute-wide problems
- Responsibility includes **brainstorming** and **finalizing the prototype design**, **managing the work flow**, **identifying potential problems**, **foreseeing future needs** and **coordination** with other divisions
- Working on the hardware development of 3 running projects which include an **automated gateway** for hostels and library, **water quality monitoring** system for water coolers, and **smart laundry system** for hostels

Technical Skills

Languages	C++, Python, VHDL, Assembly, MATLAB
Softwares	AutoDesk Eagle, LTspice, Quartus Prime, MATLAB-Simulink, SolidWorks Adobe Illustrator
Data Science & Data Mining	Numpy, pandas, matplotlib

Courses Undertaken

Core	Digital Systems, Microprocessors, Signal Processing, Analog Circuits, Probability and Random Processes, Power Engineering, Electronic Devices and Circuits, Analog Lab, Control Systems, EM Waves*, Communication Systems - 1*
Interdisciplinary Courses	Computer Programming and Utilization, Computer Networks, Biology, Economics,

** To be completed by Nov 2022*

ExtraCurriculars

National Cadet Corp *(2020)*

- Completed one year of **NCC training** as a **cadet of unit 2 Maharashtra Engineers Regiment** which included intense disciplinary training and drills, sports events, workout sessions and cultural events.
- Chosen as the **Fittest Person of the Year** among 180+ cadets in the flagship event **Battle of Companies.**
- Attended **NCC rifle training camp** at **Indian Navy base, Colaba** and completed the army obstacle course in the least time and fired **5 rounds of 0.22 deluxe rifle** on target.

Sports *(2016)*

- Represented **Kendriya Vidyalaya Morena** at **Regional level Under-19 Football** at Regional Games & Sports Meet 2016.

Cultural *(2016)*

- Represented school in **group dance** and **exhibits** at **Cluster level Social Science Exhibition** at **National Integration Camp 2016** held at K.V. No.3 Gwalior.