Shubhhi Singh | **210070084**
Electrical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Female**
DOB: 07/05/2003

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	
Intermediate	Central Board of Secondary Education	Delhi Public School Indirapuram	2021	99.20%
Matriculation	Central Board of Secondary Education	Delhi Public School Indirapuram	2019	98.80%

Pursuing a **Minor** degree by Department of **Computer Science and Engineering** at IIT Bombay

Scholastic Achievements

- Attained **AP grade** in **Biology** for exemplary performance; bestowed on academic outliers (2022)
- Secured **AIR 857** in **Joint Entrance Examination Advanced** out of **0.15 million** candidates (2021)
- Achieved **99.90** percentile in **Joint Entrance Examination Mains** out of **1 million** candidates (2021)
- Conferred with Merit Certificate; bestowed on **state top 1%** in Indian Olympiad Qualifier Physics (2021)
- Awarded **International Scholars Award** by Faculty of Arts & Science, **University of Toronto** (2020)
- Recipient of highly coveted **Global International School Singapore Scholarship**, awarded to an elite cohort of **only 10** exceptional students from over 70+ countries (2019)
- Distinguished with High Distinction by **UNSW Global Australia** Assessment for Indian Schools (2016)
- Earned esteemed **Gold Medal** for academics excellence for **seven consecutive years** at school (2014-20)

Project Work

SukhiDhan™: Empowering Digital Payments | *NUS, Singapore* *(May 2023 - Jul 2023)*

Guide: Prof. Hari Krishna Garg, Department of Electrical and Computer Engineering

- Analyzed India's **Unified Payments Interface**(UPI) system to identify shortcomings and opportunities
- Engaged in driving tangible enhancements to UPI by focusing on bolstering **inclusivity and security**
- Envisioned a transformative UPI Interface revolutionizing **Feature Phones** even without the Internet
- Leveraged **USSD or SMS-based** technology aiming to bridge the digital divide and enhance security
- Investigated **global case studies** demonstrating effective execution & merits of proposed solution

Machine Learning Modelling | *Course Project* *(Jan 2023 - May 2023)*

Guide: Prof. Abir De, Department of Computer Science and Engineering

- Optimized DCT implementation by constructing model using parallel computation of **vectorization**
- Tensorized relevance score of documents with queries using **PyTorch** for ranking in information retrieval
- Constructed diverse **classification models** using loss functions like NLL, SVM loss and Ranking loss
- Developed and implemented a strategic approach to perform the **regression task** on a given **non-linear data** by employing linear regression using L2 loss, optimization, mini-batching and early stopping

Analyzing Monte Carlo Simulations Using R | *Self Project* *(June 2023)*

- Constructed R model to generate random values for continuous and discrete distributions, like **uniform, normal, exponential, gamma, triangular and log-normal** using inbuilt and self-defined functions
- Conducted **Monte Carlo simulations** of systems to analyse **stochastic distributions of outcomes**
- Developed **transfer functions** to model the relationships between random variables of a system and conducted **sensitivity analysis** assessing the impact of changes in input on the output of a system

Simulation of Fractional Calculus using Matlab | *Self Project* *(March 2023)*

- Studied fractional-order calculus and its significance in modelling complex systems with an emphasis on the need for efficient numerical methods to solve **fractional-order differential equations**(FDEs)
- Reviewed **Riemann-Liouville, Grünwald-Letnikov & Caputo method** to solve fractional calculus
- Crafted a robust model of fractional-order calculus on Matlab, enabling precise solution of **linear FDEs** using analytical methods and **numerical approximation** by Taylor Series and Fourier Series

RISC Multi-Cycle Processor | *Course Project* *(Jan 2023 - May 2023)*

Guide: Prof. Virendra Singh, Department of Electrical Engineering

- Designed a **6 stage pipelined** processor architecture with **16-bit** computer system having **8 registers** and a customized ISA with **23 instructions** including arithmetic-logical and jump & branch instructions
- Simulated complex circuit components using **structural & behavioural modelling** in VHDL language
- Optimized the architecture for performance by **mitigating hazards** using a forwarding mechanism
- Tested on FPGA & RTL to ensure predicated instruction execution and **multiple load and store**

8051 Microcontroller Projects | *Course Project* *(Jan 2023 - May 2023)*

Guide: Prof. Saravanan Vijaykumarana, Department of Electrical Engineering

- Developed and simulated **assembly** and **embedded C** programs on **Keil IDE** for specific problems
- Performed testing of a diverse range of programs including cipher decrypter, ATM simulator, music notes generator, password reader and stop-watch by ensuring execution on **AT89C5131A** microcontroller
- Interfaced a wide range of **hardware interfacing peripherals** including LCD, keyboard, speakers, ADC/DAC and effectively integrated them into the embedded systems for performing functionality
- Implemented data transfer between peripherals and μC via **SPI and UART** communication protocols

Technical Skills

PROGRAMMING	R, MATLAB, Python, PyTorch, Matlplotlib, NumPy, Pandas, Julia, VHDL, C++, HTML, Embedded C, Assembly Language
SOFTWARE	GNU Radio, Ngspice, Github, Rstudio, Simulink, Keil μVision, Quartus, LaTeX, Realterm, AutoCAD, XCircuit, Inkscape

Key Courses Undertaken

Electrical	Communication Systems* + Lab*, Markov Chains and Queueing Systems, Electromagnetic Waves*, Signal Processing, Probability and Random Processes, Analog Circuits + lab, Microprocessors + Lab, Digital Systems + Lab, Control System + Lab*, Electronic Devices, Power Engineering + Lab
Computer Science	Introduction to Machine Learning, Logic for Computer Science, Computer Programming and Utilization
Mathematics	Calculus, Linear Algebra, Ordinary Differential Equations, Complex Analysis, Partial Differential Equations
Physics	Quantum Physics and Applications, Basics of Electricity and Magnetism

**to be completed by Dec 2023*

Positions of Responsibility

Institute Academic Coordinator | *EnPoWER, UG Academic Council* *(May 2022 -Apr 2023)*

*Responsible for shaping the academic & research landscape by enriching the experience of **5000**+ students*

- Selected as one of the **12** Academic Coordinators from a highly competitive pool of **200**+ applicants
- Orchestrated a **2-day Research Conclave** featuring keynote speeches from esteemed personalities, student presentations, workshops and engaging activities from conceptualization to flawless execution
- Spearheaded **in-Semester undergraduate research program** leading a 15+ member team for allocating over **130** projects from **20**+ departments and receiving an overwhelming response of **500**+ **applicants**
- Co-authored extensive Core Preparation Booklet encompassing insights from **40**+ **seniors** and **125**+ **university programmes** globally facilitating 5000+ students for research intern and higher studies
- Executed 3-day Orientation for **1500**+ freshmen and **3000**+ parents for seamless shift into campus life

Extracurricular Activities

- Attained **Black Belt 1** in **Taekwondo**; trained for over **6 years** and participated at **national level**
- Achieved **proficiency in Spanish**; engaged in prestigious events conducted by **Embassy of Spain**
- Passed the **Junior Diploma Examination** in **Kathak** from Prayag Sangeet Samiti, in **first division**
- Completed intensive **year-long** program of military training in **National Cadet Corps at IIT Bombay**
- Awarded Platinum certificate for being in **top 10%** in Scholarship Program for Awareness, Reasoning and Knowledge (SPARK), conducted by **the Times of India and Bennett Coleman & Co Ltd**
- Volunteered as a WiSE, IIT Bombay **mentor** to empower young girls from rural India in STEM fields