Debasish Panda

Electrical Engineering
Indian Institute of Technology, Bombay

21D070021
Dual Degree Programme
Github

Degree/Certificate	Institute	Year	CGPA/%
B.Tech+M.Tech(DD)	IIT Bombay, Maharashtra	2021-'26	8.52/10
Senior Secondary	ODM Public School, Bhubaneshwar, Odisha	2021	98.2
Secondary	DAV Public School, Cuttack, Odisha	2019	98.4

SCHOLASTIC ACHIEVEMENTS

- Secured **All India Rank 529** in **JEE-Advanced** examination among 141,699 candidates across India *(2021)*
- Secured **All India Rank 561** in **JEE-Mains** among 939,008 candidates across India *(2021)*
- Bagged **first position** in the state of Odisha in **JEE Mains**, March session *(2021)*
- Secured **All India Rank 4** in **NEST(CEBS)** among 24,328 candidates across India *(2021)*
- Secured **99.97 percentile** in **NEST(NISER)** among 24,328 candidates across India *(2021)*
- Scored **356** marks out of 450 in the Birla Institute of Science and Technology Admission Test (**BITSAT**) *(2021)*
- Qualified for **IOQC-Part II**, having been placed in the National Top 1% of candidates in **IOQC-Part I** *(2021)*
- Recipient of the prestigious **KVPY fellowship** with **AIR 419** in **SX stream** *(2020)*
- Awarded the highly coveted **NTSE scholarship**, having qualified **NTSE Stage-II** examination *(2019)*
- Qualified for **INJSO**, having been placed in the National Top 1% of candidates in **NSEJS** *(2019)*
- Qualified for **RMO**, having qualified **PRMO**, Pre-Regional Mathematics Olympiad *(2019)*

KEY PROJECTS

Bubble Trouble Game - C++ Project *(Autumn 2021)*
Computer Programming and Utilization Course Project | Prof. Parag Chaudhari, IIT Bombay

- Developed a bubble shooter video game through advanced utilisation of **C++ libraries**, **Object-Oriented Programming (OOP)**, **header files**, and **XEvents** for optimal performance and engaging user experience
- Implemented several features, such as a **progressive difficulty system** for the players with different sizes of bubbles, **shooter health**, **physical obstacles** in the path of the bubbles, a **timer**, and the **effect of gravity** on the bubbles

Probability and Random Processes - Python Project *(Autumn 2022)*
Probability and Random Processes Course Project | Prof. D.Manjunath, IIT Bombay

- Simulated the **"capture-release-recapture problem"** and the probabilistic behaviour of **data-packet transmission** via routers in parallel queues using **Python** libraries
- Applied **Hoeffding's inequality** in the context of coin-toss optimisations and emulated the same using **Python**, utilising an elementary **learning algorithm** in the process

IITB-CPU - 16-bit Microprocessor *(Autumn 2022)*
Digital Systems Course Project | Prof. Virendra Singh, IIT Bombay

- Designed the **IITB-CPU**, an **8-register**, **16-bit** elementary computer developed for teaching based on the **Little Computer Architecture** through **Behavioral-Dataflow Modelling** in **VHDL** using **Quartus Prime**
- Implemented the system as a **Finite State Machine** and optimized it to reduce the number of states involved
- Designed the 16-bit **ALU** (Arithmetic Logic Unit), **Memory Unit**, **FSM Controller** and **Datapath** in **VHDL**, and verified the entities involved in the design by performing **RTL simulations** on some selective inputs

IITB-RISC - 16-bit RISC Microprocessor *(Spring 2023)*
Microprocessors Course Project | Prof. Virendra Singh, IIT Bombay

- Implemented the **IITB-RISC**, an **8-register**, **16-bit single-cycle** RISC processor based on the **Turing complete ISA** through **Structural Modelling** in VHDL using **Quartus Prime**
- Implemented the system as a **Finite State Machine** and optimized it to reduce the number of states involved
- Designed the 16-bit **ALU** (Arithmetic Logic Unit), **Memory Unit**, **Pipeline Controller** and **Datapath** in **VHDL**
- Implemented a **6-stage pipeline** along with **data-hazard mitigation** techniques, such as **data-forwarding** and **branch predictor** for an efficient architecture

OTHER PROJECTS

Digital Logic Design in VHDL   *(Autumn 2022)*
Digital Circuits Lab Course Project | Prof. Maryam Shojaei Baghini, IIT Bombay
- Optimized combinational circuits and programmed their architectures using **Structural Modelling** in **VHDL**
- Designed and verified an **ALU** (Arithmetic Logic Unit) using **Behavioral-Dataflow Modelling** in **VHDL**
- Designed a **Mealy type FSM** using **Behavioural modelling** that recognizes a **string** on the **Krypton board**
- Verified designs by performing simulations on all possible inputs using **Scanchain** on the **Krypton board**

8051 Microcontroller Programming   *(Spring 2023)*
Microprocessors Lab Course Project | Prof. Saravanan Vijayakumaran, IIT Bombay
- Interfaced a **4x4 keyboard** with 8051 using **Embedded C**, using **software debounce** mechanism to detect accurately the password input given by the keyboard
- Programmed the 8051 in **Embedded C** to take different numbers as input through the DIP switches, then display the sorted numbers and the number to be searched using on-board LEDs
- Interfaced the 8051 with an **AFG** and **ADC**, and programmed the 8051 using **Embedded C** for serial communication with the computer through the **UART Module**, thereby utilising the **SPI protocol**

Device Physics   *(Summer 2022)*
Summer of Science | Maths and Physics Club, IIT Bombay
- Studied various fundamental physical processes and equations such as **drift and diffusion**, **recombination and generation**, the **Einstein relation** and the **continuity equation**, along with their application in various devices
- Analyzed the fundamental physics behind **Metal-Insulator-Semiconductor(MIS) junctions**, **Metal-Semiconductor junctions** and that behind the operation of semiconductor devices such as **p-n junction diodes**, **MOSFETs**, etc.

TECHNICAL SKILLS

Languages	C/C++, Python, Qiskit, VHDL, Embedded C, Assembly, SPICE, MATLAB
Softwares/Packages	LaTeX, Quartus Prime, Keil μVision, Atmel Flip, Github, ngSpice

KEY COURSES UNDERTAKEN

Electrical Engg.	Introduction to Electrical Engineering Practice, Power Engineering-I, Analog Circuits, Digital Systems, Signal Processing, Power Engineering-II, Electronic Devices and Circuits, Probability and Random Processes, Control Systems, Microprocessors, Matrix Computations
CSE & Maths	Computer Programming and Utilization, Calculus, Linear Algebra, Differential Equations, Complex Analysis
Physics	Quantum Physics and Applications, Electricity and Magnetism
Labs	Analog Lab, Microprocessors Lab, Power Engineering Lab, Digital Circuits Lab

ONGOING COURSES

Physics of Transistors, Quantum Transport in Nanoscale Devices, Quantum Information & Computing

POSITIONS OF RESPONSIBILITY(PoRs)

UG Teaching Assistant | Student Support Services (SSS), IITB   *(April 2023 - June 2023)*

- Undergraduate Teaching Assistant for the half-semester courses of **Quantum Physics and Application (PH112)** and **Differential Equations-I (MA108)**
- Conducted **weekly tutorials** for 40+ first year undergraduate students
- Was responsible for **instructing** and **aiding** students with basic concepts of Quantum Mechanics and Differential Equations, along with **evaluation** of answer scripts, as and when required

EXTRA CURRICULAR ACTIVITIES

- Won the concept-video competition, **LED**, organised by **EESA** (Electrical Engg. Student's Association) on the eve of **Impulse: the EE Department Fest**   *(2023)*
- Won the **General Quiz** by Arul Mani organised by **Literati Club, IITB** in collaboration with **ADCPS** *(2022)*
- Completed a year-long volunteering course in **National Social Service (NSS), IIT Bombay**   *(2021)*
- Qualified the Prelims of **National Anveshika Skill Test** organised by **IIT Kanpur** and **IAPT**   *(2020)*
- Represented DAV Public School, Cuttack in **Inter-School STEM Quiz** organised by Mother's Public School, Bhubaneshwar and achieved **first position** in the competition   *(2019)*