



Sachin Meena
Bachelor of Technology
in Electrical Engineering
IIT BOMBAY

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EDUCATION

Year	Degree/Certificate	Institute	CGPA/Percentage
2020-2024	B.Tech Electrical Engineering	IIT BOMBAY	6.93
2019	CBSE(XII)	JNV Chhonkarwara, Bharatpur Rajasthan	89.20%
2017	CBSE(X)	JNV Chhonkarwara, Bharatpur Rajasthan	9.2

PROFESSIONAL EXPERIENCE

Starter Protection Controller | Greaves Cotton Limited

[Jan'25-]

- Designed and developed a **starter protection logic** controller to prevent motor damage due to overload, False Cranking, short circuit, dry run, and repeated start attempts in non-automotive industrial applications.
- Designed **hardware schematic and PCB layout**, integrating AC-DC power supply (5V/3.3V regulation), **opto-isolated input sensing circuits, relay/contactor** driver stage with flyback diode protection, current/voltage sensing circuits, **EMI filtering, decoupling techniques, and SWD programming** interface for robust industrial-grade performance.
- Developed embedded firmware in C using HAL libraries, configuring **GPIO, ADC, Timers, EXTI, UART**, and Independent Watchdog; implemented interrupt-driven architecture and **state machine-based** control logic for **real-time fault detection**, deterministic response, and safe motor start/stop sequencing.
- Integrated hardware and software into a fully functional prototype, performing **calibration, debugging, fault** injection testing, and system validation to ensure low-latency protection response, reliable shutdown under abnormal conditions, and optimized **embedded system** performance consistent with industrial safety requirements.

FMUL Controller and BESS | Greaves Cotton Limited

[July'25-Dec'25]

- Designed and developed an **FMUL** Controller for fire-fighting engine systems, Designed hardware schematic creation, PCB layout design, firmware development, and optimization of control algorithms for efficient engine control and safety compliance.
- Leading a team in the development of a **Battery Energy Storage System (BESS)**, focusing on system design, integration, and performance optimization

ECU and MCU Development | Greaves Cotton Limited

[Jul'24-June'25]

- Development of a microcontroller-based **ECU** using the SPC560D40L3 for diesel engine system, focusing on real-time sensor data acquisition and injector control implementation.
- Design **schematic** circuits with integrated signal conditioning for five sensors and driver circuitry for two actuators, incorporating **CAN** protocol for reliable communication.
- Design **ECU PCB** for efficient real-time sensor data acquisition and actuator control.
- Gained hands-on experience with electronic components including **BJTs, MOSFETs, relays**, and **power converters**.

Research intern | Elcom International

[Jun'23-Aug'23]

- Designed **EMI Filters** for electronic systems, employing advanced simulation tools to model and optimize performance
- Researched **EMI's**, noise mitigation, and applied filters to enhance system integrity, showcasing noise reduction expertise
- Led in-depth study on **Line Chokes**, functions, and VFD applications, unveiling their crucial role in harmonics mitigation
- Researched **MC4** solar panels connectors extensively, gaining expertise in their design, functionality, and applications

KEY PROJECTS

Lock-In Amplifier | EE-344 Course Project | Guided By Prof. Laxmeesha Somappa

[Jan'23-Apr'23]

- Implemented a highly sophisticated lock-in amplifier system on a Red Pitaya board for precision testing an **LVDT** application
- Used advanced signal processing techniques to extract the **Amplitude** and **Phase** information from complex input signals
- Designed and configured an **Instrumentation** amplifier circuit to accurately interface LVDT's output to the Red Pitaya board
- Interfaced LVDT with Red Pitaya board using instrumentation amplifier at **Unity Gain**, preserving LVDT's differential output

Low Noise Amplifier | EE-619 Course Project | Guided By prof. Jayanta Mukherjee

[Feb'23-Apr'23]

- Proficiently designed a high-performance single-ended cascaded LNA in **UMC 180nm CMOS**, adept RF design techniques
- Achieved the Noise Figure(NF) is less than **2dB**, Signal Gain(S21) is greater than **15dB**, and Return Loss is lower than **-10dB**
- Enhanced LNA performance by Achieving IIP3 above **-8dBm**, and validated it at **880-915** MHz with low output capacitance

Multicycle RISC Processor | EE-309 Course Project | Guided By Prof. Virendra Singh

[Mar'22-Apr'22]

- Designed an **8** register, **16** bit, multicycle **RISC** in VHDL capable of executing **17** general-purpose machine-code instructions
- Modelled the system as a **Finite State Machine** and adeptly optimized it to significantly reduce the total number of states
- Designed and implemented the **16-bit ALU** (Arithmetic Logic Unit), **Memory Unit**, **Control Path**, and **Data Path** in VHDL
- Simulated and verified the design in ModelSim Software with a comprehensive custom testbench spanning all instructions

- Implemented a highly efficient and exceptionally high-performance **Multiplier Accumulator** circuit in VHDL
 - Proficiently multiplied two **8-bit** operands, adding a **16-bit** number, and used the **Dadda** scheme for efficient bit reduction
 - Implement a high-performance **16-bit Brent Kung adder** in VHDL and simulated it using a comprehensive test bench
- Credit Card Fraud Detection | Analytics Club | IITB
- [Nov'22-Dec'22]

- Designed and implemented a credit card fraud detection system leveraging advanced machine learning techniques
 - Handled imbalanced dataset challenges by utilizing techniques like **Undersampling** and **SMOTE** to create balanced dataset
 - Implemented advanced machine learning models, **Random Forest**, **Decision Tree**, and **XGBoost**,to achieve **95%** accuracy
 - Implemented model evaluation techniques including precision, recall, and F1-score to assess model performance
- Noise Cancellation In Headphones | EE-324 Course Project | Guided By Prof. D Mukherjee
- [Sep'22-Oct'22]

- Designed an Analog circuit for noise cancellation in headphones, achieving **20dB** attenuation for **100Hz** applied frequency
 - Developed an effective analog **Compensator** to enhance system stability, intricately shaping the loop transfer function
- Solar Cell | EE-790 Course Project | Guided By Prof. Pradeep R Nair
- [Feb'23-Mar'23]

- Simulated and analyzed c-Si solar cell JV characteristics using **PC1D**, demonstrating a thorough grasp of solar behavior
 - Evaluated the solar cell's performance against the **SQ Limit**, highlighting its potential compared to the theoretical maximum
- Microcontroller 8051 | EE-337 Course Project | Guided By Prof. Nikhil Karamchandani
- [Mar'22-Apr'22]

- Worked on microchip **AT89C5131A** microcontroller, utilizing its **4-level** Interrupt system, **16-bit** Timers, and full duplex UART
 - Implemented an interactive **ATM Simulator** using Keil, configuring Universal Asynchronous Receiver-Transmitter (**UART**)
 - Enabled seamless **Serial** data transfer while providing comprehensive instructions on an LCD linked to the **Pt-51** board
- Speech Emotion Recognition | EE-769 Course Project | Guided By Prof. Amit Sethi
- [Feb'23-Mar'23]

- Implemented an efficient Speech Emotion Recognition (SER) classifier by harnessing deep learning methodologies
- Boosted model resilience with data augmentation: noise injection, **Time Stretching**, **Pitch Shifting**, and Speed modification
- Executed audio feature extraction, incorporating key characteristics: **Zero Crossing Rate**, **Chroma STFT**, **MFCC**, **RMS** value
- Constructed a **Convolutional Neural Network** (CNN) based model with improved surprise and anger emotion identification

Key Courses Undertaken

Electrical Engineering	Analog Circuits, Digital Systems, Radio Frequency Microelectronics Chip Design, VLSI design, Electronic Devices & Circuits, Control Systems, Microprocessors, Signal Processing, Communication Systems, Probability and Random Processes, and Introduction to Electrical Engineering Practice
Power	Power Systems, Power Engineering(I), Power Engineering(II), Power Electronics(I), Solar Photo-voltaics
Lab Courses	Power Engineering Lab, Digital Circuits Lab, Analog Lab, Microprocessors Laboratory, Communica-tions Lab, Electronic Devices Lab, Electronic Design Lab
ML	Introduction to Machine Learning, Advanced Topics in Machine Learning, and Image Processing
Other Courses	Computer Programming and Utilization, Calculus I, Calculus II, Quantum Physics and Application, Linear Algebra, Differential Equations I,& II, Complex Analysis, Introduction to AI, Data, and Policy, Sociology

Technical Skills

Language	Python, C/C++, VHDL, and Assembly language(8051)
Software	MATLAB, Microsoft Excel, Pycharm, LaTeX, Keil, Octave, Ngspice, Quartus, and Cadence
Tools	Pandas, Numpy, PyTorch, OpenCV, Matplotlib, Seaborn, Tensorflow, and Scipy

Extra-Curriculars

- Completed an extensive year-long professional tennis course sanctioned by the National Sports Organization (**NSO**) IITB
- Engaged as an active member of the hostel **Hockey** team and actively participated in **GC** (inter-hostel) sports competitions
- Successfully built and operated a **Remote Controlled Plane** in a 4-person team, tested using Avionic **RCB6i** radio transmitter
- Successfully wrapped up a boot camp focused on **Data Science** and **Machine Learning**, organized by the Analytics Club
- Effectively completed a transformative and comprehensive year-long Academic English Course offered by British Council
- Effectively finished an extensive and enlightening self-paced training program covering fundamental **MATLAB** concepts
- Participated in a presentation on the "Significance and Utilization of Geotechnical Engineering in **Cricket Pitch** Construction
- Achieved the **Rajya Puraskar** award in The **Bharat Scouts and Guides** at JNV Bharatpur, demonstrating commitment