
# Khuzaima Ali Khan

Electrical Engineering
IEEE Student Member #99958062
Portfolio Link

+92-313-2716607
khuzaimaali998@gmail.com
khuzaimaalikhan@ieee.org
GitHub Profile
LinkedIn Profile


A Senior Electrical Engineering student at Habib University, passionate about learning, innovating, and exploring. With deep expertise in Power Electronics Converters, Electric Vehicles, and Principles of Feedback Control, I excel in programming, simulation, and system design. Skilled in power system analysis and designing, FPGA-In-Loop/HIL simulations, and computer-aided design, Research interests also include Renewable Energy Integration, Smart Grids, and Power System Analysis and Protections along with emerging technologies like Large Language Models.

## Education

- **Bachelor of Science in Electrical Engineering, Habib University** **05-2024**
  - **CGPA:** 3.83/4.0.
  - **Recent Coursework:** Power Electronics, Electric Vehicles, Electrical Machines, Signals and System, Power Systems Analysis, Power Generation, Transmission and Distribution, Large Language Models, and Principles of Feedback Control.
- **A'Levels in Pre-Engineering, Credo College** **06-2020**
  - **Grades:** 1 A*, 2 As.
  - **Honors:** Academic Society President

## Work Experience

**Dhanani School of Science and Engineering, Habib University**

- **Research Assistant** **08-2024 - Present**
  - **Job Description:** Teaching Electric Circuits Lab, Principles of Feedback Control Lab, Digital Logic and Design Lab, and Introduction to Robotics Lab.
    Advising a FYP group, working on BESS and EV integration.

**NUST-PNEC (SINC Lab)**

- **Research Officer** **06-2024 - 07-2024**
  - **Job Description:** Responsible for designing, simulating and prototyping Class-D Amplifier.
  - **Skills Used:** Power Electronics designing, Gate Driver designing, PCB designing, deployment of the Class-D Amplifier Hardware, Sensors integration.

**Dhanani School of Science and Engineering, Habib University**

- **Teaching Assistant** **06-2022 - 05-2024**
  - **Courses:** Calculus I, Calculus II, Engineering Mathematics, Electro-Magnetic Theory, Linear Algebra.
  - **Job Description:** Responsible for designing, curating and improving assignments, taking recitations sessions and conducting TA sessions for students
- **Research Assistant (Summer-2023)** **06-2023 - 08-2023**
  Conducted research on Effects of Parasitic Elements in High Frequency GaN-based Converters under the flag of **Summer Tehqiq Research Program, Habib University** under the supervision of Dr. Ishtiyaq Makda and Published work in IEEE conference INMIC-2023

**Qist-Bazaar**

- **Assistant to Data Analyst** **06-2023 - 07-2023**
  - **Responsibilities:** Using Google Analytics to analyze sales pattern, apply regression and data analytics tools to predict the next order batch size.

## Skills Summary

- **Programming:** MATLAB, Python, Verilog, C & C++
- **Practical Hardware Skills:** FPGAs, High-Power DC Supply, DC Electronic Load PEL-3111, Current Probes, ARM Microcontrollers
- **Technical & Simulation Tools:** Simulink, PSpice, LT-Spice, PLECS, PSSE, Altium Designer & LabVIEW, EasyEDA, EDA Playground
- **Embedded Systems:** Kiel $\mu$Vision5, Energia, Arduino, TivaC, Vivado, Basys-3 FPGA
- **IoT Platforms:** Node-RED, ThingSpeak & Ubidots
- **Documentation**: LaTeX, Video editing (Movavi) & MS Office
- **Design:** Inkscape, CREO, app.diagrams.net, Canva & Figma, Fritzing

## Volunteering

- **Sponsorship Coordinator in Groove-22 Habib University** **06-2022 - 08-2022**
- **Sponsorship Lead in HU Sports Olympiad and ATOMOS science Olympiad, Habib University** **06-2023 - 08-2024**

## Award and Achievement

- **Habib Merit Scholarship, Habib University** **08-2020**
  These scholarships cover up to 50% of tuition & laboratory and/or studio fees of the recipients.
- **Deans Award, Habib University** **12-2022**
  This scholarship is awarded to the top three students of their school who have the highest SGPA.
- **2nd Runner-Up in IFTP-2023, Habib University** **01-2023**
  IFTP is a 48-hour global collaborative competition organized by Texas A&M University that fosters innovation. Students from over 27 universities worldwide come together to tackle some of the challenges facing our planet.
- **Deans Medal Award, Habib University** **05-2024**
  The Dean's Medals recognize the highest academic achievement within a major.
- **Best Capstone Award, Habib University** **05-2024**
  This award is granted to the group within a major with the best performance and achievements in their final year project.

## Research and Publications

1. S. J. Shah, **K. A. Khan**, et al. **"Rapid Prototyping of Efficient FPGA-Based High-Frequency Synchronous DC-DC Buck Converter Control for Electric Vehicle Auxiliary Power Module"** - (2024 COMPEL - Paper Link)
2. A. A. Kerai, S. J. Shah, L. Maheshwari, **K. A. Khan**, et al. **"Comparative Performance Analysis of GaN FET and Silicon MOSFET in Closed-Loop Synchronous Buck Converter for Electric Vehicle Auxiliary Power Module"** -(2024 COMPEL - Paper Link)
3. L. Maheshwari, A. A. Kerai, S. J. Shah, **K. A. Khan**, et al. **"Efficient High-Frequency GaN-Based Phase Shifted Full Bridge (PSFB) Converter for Electric Vehicle Auxiliary Power Modules"** - (2024 COMPEL - Paper Link)
4. A. Ali, S. J. Shah, **K. A. Khan**, et al. **"FPGA-Enabled Rapid Prototyping of Isolated Bidirectional Full-Bridge DC-DC Converter Control for Electric Vehicle Applications"** - (2024 IECON, Accepted)
5. M. S. Qureshi, A. A. Kerai, S. A. Fatima, , S. J. Shah, **K. A. Khan**, et al, **"Effects of Parasitic Elements in High Frequency GaN-based DC-DC Converters for Electric Vehicle Applications."** (2023 INMIC) - Paper Link
6. A. A. Khan, M. Rai, **K. A. Khan**, et al. **"Team Gladiators at PAN: Improving Author Identification: A Comparative Analysis of Pre-Trained Transformers for Multi-Author Classification"** - (2024 CLEF- Paper Link)

## Projects

- **DESIGN, MODELLING, AND RAPID-PROTOTYPING OF GAN-BASED AUXILIARY POWER MODULE FOR ELECTRIC VEHICLES** **08-2023 - 05-2024**
  Final Year Project on comparative analysis of Si and GaN based isolated and non-isolated converters, modelled, designed and simulated non-isolated (Buck) and isolated (PSFB) converter for Electric Vehicle's APM on industry grade tools.
- **Bidirectional DC-DC Converter Controlled via FPGA-in-Loop for Electric Vehicle's Applications** **11-2022 - 05-2023**
  Rapid Prototyping for PI controller using Hardware-in-Loop technique with FPGA to capture high dynamic response in transient and steady state behaviour of converter.
- **Case Study - ELECTRIFYING TWO AND THREE WHEELERS IN PAKISTAN - Presentation** **11-2023**
  This case study explores the impact of introducing electrified two- and three-wheelers in Pakistan to reduce greenhouse gas emissions, improve the economy, and provide cleaner transportation options amid rapid urbanization.
- **GaN transistors based DC-DC converters for Electric Vehicles - Poster Presentation - Report** **1-2023 - 05-2023**
  Developed how GaN devices can enhance overall efficiency of these converters using Systems Engineering Process.

- **Design, Simulation, and Prototype of DC-DC Buck Converter - Report** **1-2023 - 05-2023**
  Complete design of DC-DC buck converter along with its components, simulation and hardware results.
- **DIFFERENTIAL DRIVE ROBOT ON GAZEBO - Final Project Video** **1-2023 - 05-2023**
  A differential drive robot navigates a warehouse using the A* algorithm and SLAM for localization, avoiding obstacles and retracing paths efficiently.
- **Pick and Place Robot Using Phantom X Pincher Arm - Video** **1-2023 - 05-2023**
  Programmed Industrial Robotics Arm for the Pick and Place Project for Intro to Robotics Lab.
- **ATOM - Robo War Robot Car - Video - Report** **08-2022 - 12-2022**
  Designed and programmed defense and attack robot named ATOM using Arduino on TiVaC Texas Instruments MCU in Microcontroller and Interfacing Course.
- **Dual Axis Solar Positioning System - Report** **08-2022 - 12-2022**
  Designed and implemented a Dual Axis Solar Positioning System that tracks the sun's position in real-time and adjusts solar panels to maximize energy output in Principles of Feedback and Control Course.
- **Logic Mates on Basys 3 FPGA Board - Final Project Video** **07-2021 - 12-2021**
  "Logic Mates" is a keyboard-interfaced digital logic game where players collect blue balls to gain lives while avoiding red ball enemies.
- **Design, Simulation and Prototype of Cascaded Amplifier - Report** **07-2021 - 12-2021**
  Designed a cascaded amplifier with BJTs using PSpice simulation software and hardware for hands-on experience in analog circuits.