With the rapid advancement in technology, the field of electrical engineering is progressing at breakneck speed. We are already witnessing the beginning of electric vehicles such as cars, buses, and aircraft, and these are yet to see a lot more positive changes. I have deeply researched and understood the electric circuitry that allows a gas engine to charge the battery in a hybrid vehicle, and this has intensified my interest in the field. I have also been interested in the manufacturing and designing of the Airbus City, which is an electrically-powered VTOL aircraft demonstrator. These vehicles are cheaper, consume less fuel, and create less noise as compared to conventional vehicles. I wish to learn more about electric vehicles and aircraft and get involved in research in this area. In order to do this, the first step I would like to take is to pursue a postgraduate degree in Electrical Engineering with specialization in Avionics.

My interest in electrical engineering has been fueled by my father who is also an electrical engineer. I have spent countless days in his workshop amidst motors, generators, and other electrical equipment, and learnt about their functionalities from my father. After completing high school, the obvious choice of undergraduate program for me was Electrical and Electronics Engineering. During this period, I enjoyed learning about various subjects such as electrical machines, control systems, power generation engineering, power transmission engineering, electrical measurements and instrumentation, switchgear and protection, and high voltage engineering. Other subjects that I enjoyed were electrical engineering materials, electric power distribution automation, solar energy, utilization of electrical energy, and pulse and digital circuits. My practical courses that I found most useful were networks and simulations, control systems and simulations, electrical machines, electrical measurements, power electronics and simulations, and pulse and integrated circuits.

My coursework combined with my previous practical knowledge of electrical engineering motivated me to undertake a project where I could apply my knowledge and demonstrate my skills. So, I decided to develop an automatic watering system for plants by using Arduino Uno and Arduino software. The objective of this system was to detect the moisture level in the soil and automatically water the plants if the moisture level is low. I wrote an Arduino program to take inputs from a soil moisture sensor, and operate water motor switch based on the data received. Through this project, I learnt how to integrate and use electrical components such as soil moisture sensors, jumper wires, buzzers, and submersible water pumps. I also learnt how to perform Arduino coding and integrate it in real world electrical equipment.

This project gave me the confidence to take up a more complex project for my undergraduate thesis, and so I decided to work on maximum power point tracking. The objective here was to increase the efficiency of a basic solar panel by designing a maximum power point tracker. This tracker could calculate and maintain the maximum amount of power from a solar panel by using a DC/DC converter and an Arduino board. I modeled the solar panel using a DC voltage source and then converted it into a DC/DC converter. I used Arduino to write a code to determine the frequency of the PV source for pulse width modulation. The Perturb and Observe (P&O) method was used to calculate the maximum power of the PV source outputs and the necessary duty cycle for the PWM. This information was transmitted to the PV source and adjusted accordingly to maintain it at the peak power. To test the design, I adjusted

the DC source to various voltage inputs and the maximum power was successfully calculated each time. This prototype can be used to track the maximum power point of different solar panels and helps customers define the most efficient solar panels available in the market. Through this project, I became familiar with MATLAB Simulink software, implementation using breadboard and solderable board, Arduino coding, and solar panels.

I was eager to see how electric components could be innovatively used in real world projects and so, I attended an internship at Bharat Electronics Ltd, Hyderabad. Here, I learnt about night vision cameras, types of night vision devices, features of binoculars, and principles of passive sight. After this, I attended another internship at Ts Transco (Transmission Corporation of Telangana Limited), Hyderabad on the conditioning and monitoring of transformer oil. During this period, I learnt about the benefits of conditioning, functions of transformer oil, and types of transformer oils. I also carried out several practical tests on the appearance, flash point, interfacial tension, acidity, breakdown voltage, TAN delta and resistivity, dissolved gas analysis, and paper insulation analysis of transformer oil.

As my main interest was in the field of electric vehicles, I decided to undertake an internship on hybrid and electric vehicles conducted by Devise Electronics Pvt Ltd at BITS Pilani Hyderabad campus. Here, I learnt about hybrid and electric mobility industry standards, hybrid electrical vehicles development, IC engine design, HEV architecture, electric motors and generators, batteries, power electronics, and control systems. I completed a hands-on training on HEV drivetrain components and developed an e-bike using a brushless DC motor (BLDC motor). This internship helped me understand the design and development of electric vehicles and gave me insights into the current direction of the field.

Apart from these internships, I have carried out several industrial visits, each of which has left me with immense knowledge about electrical engineering. One of my first visits was to the 220/132 KV Gas Insulated Substation at TS Transco, Hyderabad. Here, I learnt about the 3x160 MVA power transformer and its capacity as it was used in that substation. I also became familiar with SCADA and its role in power system protection and control. Next, I visited Ruby Transformers, Hyderabad, where I learnt about the entire transformer manufacturing process. In order to grasp and process all this information better, I took several online courses on Aircraft Maintenance from NPTEL, IIT Kanpur, IPv4/ IPv6 Addressing and Subnetting from Udemy, and Fundamentals of Electronic Device Fabrication from NPTEL, IIT Madras. All these experiences and extracurricular learning helped intensify my passion for electric vehicles and perfectly complemented my undergraduate coursework.

After completing my undergraduate education, I decided to take up a job to immediately put my knowledge into action. So, I started working as an Assistant System Engineer at Tata Consultancy Services, Hyderabad. Here, I worked on the maintenance, operation, and troubleshooting of the Adjunct Processor Group (APG) in AXE-IO Ericsson. When required, I used shell scripting, installation of software upgrades, and vulnerability assessments to fix issues with the APG. My work experience here taught me a lot of different concepts in connection protocols, Linux environment, Ericsson proprietary tools, Tenable Nessus vulnerability scanner, and BASH scripting languages.

My love for designing and developing hybrid and electric vehicles, particularly aircraft, has motivated me to take up this field, and I wish to take it one step further by pursuing a postgraduate program in avionics. After completing my higher education, I look forward to working in a company such as Boeing, Airbus, or Tesla and contribute to the new and innovative inventions that are going on in these companies. Eventually, I would like to start my own company where I can research and develop electric airplanes and vehicles with considerable advantages over jets, fuel-powered airplanes, and gasoline cars. These vehicles will lower maintenance costs which will result in cheaper fares for the passengers.

In order to kickstart my career in developing electric aircraft, I would like to start with pursuing a postgraduate degree in Electrical Engineering with specialization in Avionics from your esteemed University. I am extremely eager to learn about the technological developments of electric vehicles in different parts of the world. I wish to get involved in research in this area and contribute my efforts for a healthier planet, less noise pollution, and lower costs. Your state-of-the-art research facilities will help me implement my project ideas into life-size prototypes. Being guided by accomplished faculty at your premises will help me understand the practicality of my ideas and how they can be improved to make a valuable contribution to this field.

My dream of designing and developing my own electric aircraft has brought me this far, and now I wish to advance my knowledge and skills through your structured postgraduate program.