My fascination with automobiles has exponentially increased over the years, and as my curiosity increased, so did my urge to learn about the engineering behind automobiles. Having worked for an automobile manufacturing company for more than two years, I have realized that there is a lot of untapped potential in this field. In order to thrive in this industry, I need to become up-to-date with the latest developments and technologies, and concentrate on upgrading my engineering skills. One area of automobile engineering that particularly excites me is electric mobility. I believe that with the current state of our environment and rapid depletion of fuels, electric and hybrid vehicles are our future. In order to make worthwhile contributions in this area, I wish to take the first step by pursuing my postgraduate degree in Mechanical and Automotive Engineering.

I have been deeply interested in cars since childhood and I have spent my free time learning about the mechanisms of the things around me. In order to realize and intensify my passion for machinery, I decided to pursue my undergraduate studies in Mechanical Engineering. During this period, I enjoyed learning about topics such as strength of materials, kinematics of machines, finite element analysis, design of machine elements and mechanical systems, heat and mass transfer, mechatronics, and system theory. However, my favorite subject was automobile engineering as this gave me the chance to understand the basic mechanisms behind the operation of automobiles. I also acquired hands-on experience through my practical courses on automobile engineering, heat and mass transfer, IC engines, and CADD.

Despite the fact that my undergraduate coursework sufficiently covered all advanced concepts of the field, classroom learning was not enough to satiate my passion for automobiles. In order to directly get involved in working with automobiles, I joined Team Srijan which was a formula student team of my college, BIT Mesra. The objective of this team was to design and develop open cockpit formula-style racecars to compete at national and international events. Initially, I familiarized myself with the different sub-systems of a vehicle, and I took particular interest in the design, analysis, and manufactuirng of the chassis. During the chassis design period, I performed Finite Element Analysis using the package provided in SolidWorks and ANSYS Mechanical APDL. I participated in Formula Student India 2015 with my chassis design, and got the opportunity to interact with other teams and the judges. This experience gave me insights into the latest technologies for chassis design and other managerial aspects of a project.

Based on my first year's experience in Team Srijan, the following year I undertook complete responsibility for designing the chassis of our car. I began work on the design by defining a torsional stiffness value through mathematical model comparisons. These calculations helped me in designing the lightest spaceframe chassis among all the other teams, which helped us in securing the 7^{th} position in Formula Student India 2016. I also published my results in IJRET under the title "Design of a Formula SAE chassis according to lateral load transfer distribution". This was a wonderful experience for me in the design and manufacture of automobiles, and I learnt several mathematical and engineering-based principles used in automobiles.

After securing the 7th place in the Formula Student India competition for my college, I was confident in taking up a more complex project for my undergraduate thesis. So, I decided to work on the design optimization of a car underbody diffuser for obtaining maximum downforce. My approach was to use different diffuser angles and principles of computational fluid dynamics to study cars with and without an undertray. I simulated a 2D bluff body using different turbulence models such as Spalart-Allamaras model, K-epsilon model, and K-omega model. I plotted the graph of variation of pressure coefficient along the length and compared the result with the available experimental data to select a suitable model for further analysis. After this, I developed a 2D mesh model in Gambit and verified the results with experimental data. Finally, I developed and simulated a 3D bluff body and compared the downforce for different diffuser angles and the number of tunnels. When comparing cars with and without the undertray, I found that there was an improvement of 2.5% in the lap time of the car fitted with the undertray. This project gave me profound knowledge and skills in the design and development of automobile components, and how to brainstorm ideas in improving existing automobile designs. In particular, I acquired in-depth skills in CAD software such as ANSYS Fluent, Gambit, and Simscale.

In order to get exposure to real world projects, I decided to undertake internships where I could understand how my practical skills could be applied in companies. First, I visited Schlumberger in Kuwait, where I worked on directional drilling technologies used in oilfields. Here, I understood the various directional drilling services and their applications in oilfields around the world. Next, I visited the Kuwait oil company for an internship in IT service desk and its related IT operations. During this period, I developed skills in office software such as Microsoft Office, Microsoft Excel and other Microsoft products. Both these internships trained me in different areas and I got the chance to diversify my knowledge through these experiences.

After completing my undergraduate education, I wanted to gain some experience in the field of automobiles. So, I started working at Tata Motors as a Graduate Engineer Trainee in Sales and Marketing. I was the Territory Sales Manager in Surat, and I was responsible for increasing the sales of buses and small commercial passenger vehicles in my operating region. Part of my duties involved interacting with customers, collecting feedback, and understanding our competitor's automobiles. Based on this, I spoke to potential buyers about our technological superiority and unrivalled product portfolio. I also conducted activities like vehicle demonstration, service camps, fuel tests, and customer meetings. Through my efforts, I was able to increase the sale of automobiles within my territory from 80% to 93%.

After working in the sales domain, I was transferred to a CV margin improvement project on the basis of my performance. The objective of this project was to ensure sustainable and profitable growth in the CV and PV markets by efficiently meeting customer needs. I was involved in developing cost-effective solutions for improving the profit margin of our products without compromising their quality and performance. For this, I developed Should Cost models for helping us understand the cost drivers of our automobiles. In order to cut costs at the raw material level, I worked with people from the research and development, and quality control departments. I was the cost engineering representative for gearbox and cooling systems of automobiles, and I was charged with the responsibility of making these components cost-effective in the final product. My experience during this period helped me learn about

the real world research problems in automobiles and how these should be addressed to increase profitability for the company.

I believe that my experience in sales and cost engineering of automobiles gives me an edge in designing vehicles as I now know what the end-user needs and expects from the automobile. At the same time, I can now keep in mind the final cost of the product and design a vehicle in a way that does not overshoot the budget. In order to do this, I feel that I need advanced knowledge and skills in the field of automobile engineering, and so I wish to pursue a postgraduate degree in this area. After completing my higher education, I would like to work as a design engineer in a well-established automobile manufacturing firm. I am particularly interested in exploring the domain of electric mobility and designing electric vehicles for widespread commercial and personal use.

In order to give flight to my ambitions, I would like to pursue a rewarding postgraduate program in Automotive Engineering from your esteemed University. I am particularly interested in learning about the various automobile components, and their design and manufacturing processes. I also want to deepen my understanding of the mathematical and statistical models that are used during these processes. My experience in designing different vehicle components will help me conceptualize projects and I look forward to executing them at your state-of-the-art research facilities. Having worked in two different teams over my undergraduate and work periods, I am comfortable in collaborating with people and working towards achieving objectives together. Being guided by accomplished professionals at your premises will help me enhance my understanding of the field including its future scope and potential.

Given my intense passion for the field and motivation to get involved in automobile research, I feel that I can make the best use of your postgraduate program in developing a well-rounded skill set for my future projects.