

As a student of Mechanical Engineering, I have constantly observed and appreciated the role of engineering technologies in shaping our world from the field of self driving automobiles to intelligent diagnostic systems. When I studied Industrial Engineering as one of my courses, I was fascinated by the seamless integration of mathematics, engineering, and technology for the large-scale management of complex processes and sophisticated equipment, while maintaining high product standards through the use of high quality raw materials and top-notch production processes. I sought to acquire more knowledge about this field through my projects and discussions with my teachers which has served to intensify my passion for the subject. Burning to get industrial work experience and to observe the production processes firsthand, I undertook several industrial internships at Uno Minda and QH Talbros where I was able to understand the working and management of a large industry. Having worked in the production and quality control departments, I have acquired several important skills that cannot be taught in classes such as removing non-essential processes from the manufacturing unit and completing tasks efficiently. The most important quality for running an industry is teamwork and I have sufficient experience in working in a team for participating in various competitions during my undergraduate period. Before I enter the industrial sector as a trained expert, I wish to gain advanced knowledge and skills in supply chain management, manufacturing processes, and quality management, and to achieve this, I intend to pursue a postgraduate education in Industrial Engineering.

Since childhood, I have been fascinated with toy cars and other things that were made with mechanical and electrical parts, and I have spent countless hours in opening them up and studying the internal construction. While doing this, I would try to understand how the individual components contributed to the functions of the device. After completing high school, I was interested in exploring the use of these components further in building functional systems for the benefit of different industrial sectors, and so, I decided to pursue my undergraduate studies in Mechanical Engineering. During this period, I enjoyed my courses on Manufacturing Processes and Manufacturing Science where I learned about various techniques such as welding, forging, molding, and metallurgy both theoretically as well as practically. Having spent a majority of my time building various mechanical systems, I acquired expertise in using machines such as lathe, drilling, and mig welding machines. When I was introduced to my course on Industrial Engineering and Operations Research, I gained an in-depth understanding of how an industry operates and learned about the importance of finding optimal solutions for problems to fulfill customer expectations. Apart from these, my courses on Micro and Macro Economics, and Probability and Statistics, helped me understand the relationship between supply and demand helping me see the bigger picture of how the world economy works.

Eager to acquire practical experience in all the mechanical processes and tools I had learned in my theory and practical classes, I participated in two competitions – Enduro Student India and Mega ATV Championship – where I got the chance to demonstrate my innovative thinking and technical skill set. As part of the Enduro event that was conducted in Pune, I designed and fabricated an all-terrain electric automobile that was powered by hub motors and a lithium ion battery. I also worked on the inboard braking system with the help of Vespa Callipers that helped my team successfully clear the braking and safety tests. For the Mega ATV Championship conducted in Goa, I designed and fabricated an all-terrain combustion automobile, using SolidWorks for the chassis design and Lotus QA for testing

the suspension. This vehicle was able to reach the final endurance run and this was the first time this has happened for a team from my University.

Both the above mentioned competitions were held at a national level where we were provided rulebooks for building the vehicle prototype. As the vice captain of my team in the Mega ATV event, I had taken complete responsibility for accomplishing the goal by dividing my entire team into different departments for focusing on various aspects of the vehicle. I had taken up the design of the braking system and was responsible for gathering sponsors for our project. At the same time, we got the chance to participate in the Enduro competition and as we were already confident about our Mega ATV project, we decided to participate in Enduro too. The vehicle we built for the Mega ATV event cleared all technical specifications and we managed to cover 45 kms in a period of 4 hours. Working on both these projects have given me hands-on experience in working with almost every machine in my University. Apart from this, I acquired strong leadership and communication skills, and learned to manage academics and both my projects simultaneously.

Wanting to diversify my skill set and implement newer concepts covered in my theory classes, I undertook the development of a 3D model of a sniper rifle along with its stand. For this, I not only built the rifle but also wrote the CNC code to operate the trigger. This project gave me immense knowledge of the parts of a sniper rifle and the use of SolidWorks for its assembly. It also sparked my interest in CAD CAM software and I went on to pursue an online course in this subject to acquire expertise in SolidWorks and related software.

Interested in taking up more challenging projects, I signed up for TECHgium conducted by Larsen & Toubro Ltd, where they posted various challenge statements and we could select one of them and submit a proposal. My team members and I selected a project on reducing the number of accidents due to distraction on the drivers' part as the number for these types of incidents is on the rise. To address this problem, we proposed building a virtual display in the driver's field of vision where critical information about the automobile and traffic would always be visible to the driver for providing an enhanced human machine interface. The challenging part here was the optics as we experimented with projectors and mirrors to create the virtual display. Our project cleared the initial round of selection and we were called to Bangalore for demonstrating proof of concept for our system. Through this work, I have developed immense technical expertise in virtual systems apart from learning team work and effective idea presentation.

Eager to keep moving forward in developing intelligent systems for safety of people, I developed the design of an elevator that could travel between 3 floors carrying a payload of 0.1 kg. The challenging part of the project was to make it using the provided material which was a poly carbonate board. I further created and implemented the logic for this elevator ensuring that it would move smoothly and efficiently. This project taught me how to face challenging tasks head on and use logical reasoning and critical thinking to accomplish project objectives.

Around this time, I read about theoretical musings to increase the efficiency of vertical axis wind turbines, and this coupled with my drive to work under the distinguished Dr. Nishant Mishra for my

undergraduate thesis project, motivated me to take up this work. For this project, I decided to focus on the Savonius wind turbine, where I studied the impact of dimpling on the blades of the turbine and its effect on the wake region. I started out with a literature review to understand various theoretical inferences, proposals, and CFD analysis for enhancing the efficiency of the Savonius. From the literature, I picked out some of the best and most efficient parameters for the geometry of the turbine and attempted to recreate the turbine using these parameters on Ansys. The most challenging part here was to recreate the dimples of the curved C blades of the Savonius turbine, and after considerable effort I was finally able to achieve the design and simulation of the turbine on Ansys. Following this, I used different configurations and arrangements of the turbine to plot graphs and derive inferences on the projected efficiency of the wind turbine. So far, I have acquired immense theoretical knowledge of wind turbines and their construction along with hands-on experience in using Ansys for design and simulation. I now look forward to verifying my results experimentally to prove the inferences that have been obtained from theoretical analyses.

In order to gain real world knowledge of the design and fabrication of mechanical systems and operation of industrial processes, I have undertaken several internships. One of them was in Minda Industries, Gurugram, where I learned about the manufacturing processes of two and three-wheeled handle bars. This gave me immense knowledge of CNC bending, budding, and annealing processes along with a glimpse of strength and dimension testing in the Quality Control Department. Wanting to explore other machines and processes, I did another internship at QH Talbros, Dehradun, where I learned about the manufacturing of ball joints through the use of burnishing and milling machines. Alongside this, I acquired knowledge of control arm assembly and steering knuckles. Finally, I wanted to learn about the plastic production process in depth, and so I undertook an internship at Kanha Plastics, Dehradun, where I got an overview of the manufacturing of uPVC and PPR pipes. During this time, I received hands-on experience in processes such as injection moulding and equipment such as the semi-automated CNC machine and hydraulic pressure testing device.

My three industrial internships have helped me understand the differences between working on undergraduate projects and working in the corporate world following client requirements and adhering to deadlines. I realized the importance of setting high quality benchmarks at every stage of the production process in order to deliver the best quality products to clients. Working with various machines has enabled me to apply my theoretical knowledge and understand how my education fits in with the industrial requirements.

An important thing that I understood from my internships was the power of team work and how to collaborate and communicate with team members to get tasks accomplished on time. So, to learn about the principles that govern effective team building, I took a course on Group Dynamics in my college, where students belonging to different departments such as mechanical engineering, electrical engineering, management, and computer science were teamed up and given a series of tasks to complete collaboratively. This course has shaped me as a professional as I learned to depend on and work with people I barely knew, and I developed a deep respect for other people's knowledge and skills realizing that my work could not have been accomplished without my teammates' help. When we

completed all the assigned work successfully, we felt a sense of achievement knowing that we had put our best skills together to submit the highest quality work possible.

Being a natural leader and initiative taker, I have managed most of my team members when we represented our college for various competitions and I know how difficult and fulfilling it is at the same time. Imagining what it would be like managing an entire industry seems unfathomable to me and this is what attracts me to this field. Performing every task at every stage of industrial processes is crucial as the smallest mistake can lead to major defects in the final product. So, to acquire advanced knowledge of the various manufacturing processes and industrial management principles, I wish to pursue a postgraduate education in Industrial Engineering. After completing my higher studies, I would like to either work in the production engineering department or supply chain management contributing my domain knowledge and skills for optimum performance of the processes. Eventually, I want to reach the stage where I am responsible for decision making and policy making processes leading the company to growth, profits, and enhanced productivity.

In order to fulfill my goal of optimizing production processes, I wish to take up a postgraduate program in Industrial Engineering at _____ University. The numerous research projects that I have worked on and the internships I have attended during my undergraduate period have given me a strong command over the concepts. I now wish to deepen my understanding of the field and become up-to-date with the most recent trends in the fields of manufacturing processes, resource management, and supply chain management. I intend to acquire a strong technical skill set by pursuing several exciting and challenging projects at your state-of-the-art research facilities. Being guided by accomplished faculty such as _____ and _____ at your premises will help me take my projects to the next level and acquire a more comprehensive understanding of the field.

My experiences in using my knowledge and skills for research projects in my field of interest have given me a strong knowledge of my subjects, and I am confident that my aptitude and passion for the field will help me stand out at your campus.