

Statement of Purpose

My decision to pursue higher studies in Mechanical Engineering is hardly an accident. I believe that my childhood education in an Air Force School and the accompanying exposure to the world of airplanes, automobiles, and other marvels of mechanization in those early days inspired in me an insatiable curiosity and love for machines.

The undergraduate program in Mechanical Engineering at VIT-AP (Vellore Institute of Technology-Andhra Pradesh) has provided me with a launching pad to further explore my passion for machines. During my stay at VIT-AP, I got exposed to core-areas such as "Engineering Mechanics Statics," "Engineering Mechanics Dynamics," "Strength of Materials," "Theory of Machines," "Machine Design," among others. Besides these core areas, I have also added the advantage of being introduced to specialized areas such as "Polymer Engineering" and "Internal Combustion Engines." While these areas are fundamental to Mechanical Engineering, contemporary engineering practices have grown to be significantly reliant on computers and programming. Fortunately, my undergraduate program has also enabled me to study areas such as "SolidWorks," "AutoCAD," and the basics of "ANSYS."

I have participated in several projects and internships that greatly refined my understanding of Mechanical Engineering, particularly design aspects. During my fifth semester project, I designed an "Agri-Bot", which is a multipurpose agricultural machine for ploughing, watering and many more. This "Agri-Bot" is a di-wheel robot with the wheel axle attached to an actuator. This actuator makes the axial size vary according to the requirements of the ploughing width. During this project, one of the challenges I faced was to design a mechanism by which the axial should actuate smoothly. Initially, I had a tough time designing the actuator. However, while I was sitting in the computer lab one day, I observed how a keyboard desk works. The thought of applying the principles underlying the cabinet profile's sliding mechanism using ball bearings occurred to me. I successfully implemented a similar mechanism in my project by designing an input shaft attached to a motor connected to this mechanism. This project helped me strengthen my understanding of the design aspects also taught me that inspiration could be found anywhere, even from the most straightforward machines in our daily life. I have also worked on another project, titled "Design and analysis of lengthwise gradient honeycomb core for obtaining graded beam properties." In this project I have researched on honeycomb's property variation with cell size variation and observed which mechanical properties are enhanced by changing the cell size, varying in the length direction. The gradient cell hexagon in the Honeycomb structure was one of the most challenging designs I have ever faced. I have spent three months to meticulously design a Honeycomb structure of varying cell. In this process, I have learnt and got exposed to new features of SolidWorks which was enlightening. I have also built a website to showcase my two main projects.

URL- <https://shanmukhram1.github.io/portfolio/#/home>

Later on, in my second internship at "ILLENIUM," I was assigned to design a 3D model smart garment that monitors the human body's vitals such as ECG, muscle activity that potentially can help many fitness freaks to enhance their workouts and yoga. The hardest part of the design was not the garment but the detachable arc design, which is a technology hub that houses all the major electronics. This internship thoroughly exposed me to the various aspects of design in a truly lasting way.

While academics have usually occupied centre stage in my life, and work has mostly felt like play to me, I have participated in and, I am happy to say, even excelled at traditional forms of playing as well. I have been an avid basketball player and served as my University's basketball team captain for two consecutive years (2017-2019). I have also participated in both the Cricket and the Table Tennis teams (2017-2018). Besides these, swimming, dancing, and painting are my hobbies. Apart from sports, I have volunteered to "BALA VIKASA," a non-profit organization with a mission to support and strengthen India's poor communities' development process. I was part of a team to educate and bring awareness to villagers on the implications of drinking contaminated water. These activities have offered me a separate space of freedom and peace that has enabled me to evolve into the dynamic and multi-faceted person I am today.

To fuel my zeal for further research and continuous learning, I have decided to pursue a Master's Programme in Mechanical Engineering and get involved in higher studies in this area. My intended area of specialization in the graduate program in Mechanical Engineering at Texas A and M University will be in Mechanics of Materials. I am particularly enamoured by Professor Shadi Balawi's research on Honeycomb Structures and would like to be involved given an opportunity. Although there is a vast scope for research in India, the desire for broader exposure and the desire to experience better education has prompted me to seek this opportunity to study in the United States.

As Texas A and M University has highly reputed Master's and Ph.D. research programs in various engineering fields, its laboratories and research projects offer cutting-edge facilities. I believe that this University would provide the perfect platform for me to pursue my training and research in Mechanical Engineering. I would also be very grateful for any university opportunities for research or teaching assistantship. This opportunity will ease my financial burden and prepare me for a career in research and teaching. I eagerly look forward to a challenging and energizing career in Mechanical Engineering at your institute. While it may be quite demanding at times, I am confident that I can make a meaningful contribution to the ongoing research and development and live up to the high standards expected of me at your University. I eagerly await your response and hope to grant me admission to the Master's program at your esteemed University.