1. De-orbit mechanism is a device to mitigate alarming issue of space debris. This was a year long capstone project to research and develop solution for removing small satellites (space debris) from Low Earth Orbit (LEO).

After reviewing more than 20 articles and research papers for possible solutions and materials, 200+ hours were logged on drafting and modeling software such as AutoCAD, Creo and Catia for spawning engineering drawing of proposed solution. Various components for prototype development was manufactured by 3D Printing technology, while visual basic and Arduino microcontroller was utilized for development of customized GUI (Graphical User Interface) and wireless operation, respectively.

Lengthy simulations and analysis were carried out on AGI Systems Tool Kit (STK) software to authenticate the effective working of developed de-orbiting mechanism.

1. The Case Study on Lunar Rover Anchoring Mechanism held by Canadian Space Agency was a part of graduation coursework. As Canada is Aiming for Moon, the aim of the case study is to design a retractable anchoring mechanism to stabilize the rover on the lunar surface under extreme atmospheric condition.

Mission and systems requirements were outlined, material and thermal properties were analyzed, mechanical and dynamic launch environment compatibility was verified, and vibration and radiation exposure calculation was carried out; and blend all the information together and logged around 350 hours on SolidWorks and Ansys to generate engineering drawing and carried out essential analysis of developed anchoring mechanism.

Up to 95% proof of concepts for mission requirement was delivered after thoroughly understand launch manuals of Ariane 5 and Falcon 9 and establishing compliance of proposed anchoring mechanism with launch vehicle based on identical launch manuals.