In this project, the target is to design and implement a DC motor controller which should deliver minimum 2 kW power during at least 5 minutes. For these requirements, we decided to use Buck Converter topology in our design. This topology divides into two parts. In the first part three phase AC converting to DC and in the second part, there is DC-DC step down converter.

Motor speed controlling is also expected from us while covering the design. For this purpose, we used Arduino board to control Buck converter, and it provides PWM output due to speed demand.

During covering our design, we have made a lot of simulations on Simulink, MATLAB, and gathered data for the selected topology. Moreover, these results help us while selecting components used in our design.

During the implementation, we faced with a lot of problems. One of the most familiar problem is that IGBT is burned out because of large amount current due to the instant of sharp input set point changes of the motor. We placed the snubber to gate of IGBT not to face with this problem. Snubber works by limiting instant sharps, but even though our IGBT is burned out since we started to run motor with so high voltage from three phase supply.

To sum up, we got a lot of practical experiences which are different from lecture studies thanks to this instructive project. We learned the converter topologies, useful information about protection, manufacturability and managing budget. As a result, this project helps us to encourage our engineering skills.

We also recorded our experiences as video during working process as seen in the following link.

<https://youtu.be/s0M1ChqQ4oM>