**Introduction**

In this project, the aim is to design and implement an AC/DC converter to drive our DC motor. This objective requires a multiple-step process to result in successful implementation. First of all, one of the options among all available topologies must be chosen considering the trade-off with other topologies. For that purpose, a diode rectifier and buck converter has been chosen considering its advantages such as easy switching control, simple speed control and gate drive, ripple control and high efficiency. Next, various simulations have been done on computer environment so that critical parameters such as startup currents and voltages, steady-state currents and voltages, peak reverse currents and voltages and rated component values can be determined. This process made it possible to choose proper components for the converter. Afterwards, real-time tests have been done to observe system performance and temperature variance.

All of these steps will be explained thoroughly in corresponding subsections. Main challenges and cost analysis will also be mentioned.