



# NORTH SOUTH UNIVERSITY

Department of Electrical & Computer Engineering

Spring '19

**EEE 499B**

***ExoArm: Patient Rehabilitation, Mobility and Heavy-lifting,  
using COTS products***

*Project Supervisor:*

**Dr. Shahnewaz Siddique**

**Assistant Professor**

**Department of Electrical & Computer Engineering**

**North South University**

*Section: 3*

*Group No.: 2*

*Group Members:*

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## Agreement Form

We take great pleasure in submitting our senior design project report on **“ExoArm: Patient Rehabilitation, Mobility and Heavy-lifting, using COTS products”**. This report is prepared as a requirement of the Capstone Design Project CSE/EEE/ETE 499 A & B which is a two semester long senior design course. This course involves multidisciplinary teams of students who build and test custom designed systems, components or engineering processes. We would like to request you to accept this report as a partial fulfilment of Bachelor of Science degree under Electrical and Computer Engineering Department of North South University.

### Declared By:

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Project Supervisor

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## Acknowledgment

The 8-month long month journey has been a gruelling one with various difficulties and hurdles thrown upon our way but not for once we felt the need to look back. This has only been possible because of the faith shown in on us by our project supervisor, Dr. Shahnewaz Siddique.

We would like to cordially thank him for providing us with continuous support and motivation throughout the course of the project. The project would not have been completed without his guidance and scrupulous supervision.

We would also like to thank the Department of Electrical and Computer Engineering for shaping us into who we are and giving us the lessons that we require, going out in the real world.

We are thankful to each and every one who has lend a hand of help in the project, starting from faculty members at North South to the crafts-men at the workshop. Lastly, we would like to acknowledge the people for whom we have come this far, our families and friends, thank you for always believing in us.

## Abstract

Exoskeleton, a revolutionizing new term which has taken the world of technology by storm in the last few decades. A technology, improving at a rate faster than anticipated. Some living organisms are found to be naturally supported by external skeletons, giving birth to the concept of exoskeleton where human beings who are physically disabled are to be supported by an external framework to support and aid them in their day to day activities. Therefore, using the concept of exoskeleton we plan to build an automated, at the same time independent, mechanical arm for rehabilitation and providing aid to the people who are suffering. In addition to the primary goal, our device will also be able to aid people without any disabilities, in performing daily chores or lifting heavy objects. We plan to execute this system using commercially off the Shelf Components (COTS) such as: Arduino, Myoware Muscle Sensor and Linear Actuator, having researched on efficiency and cost of other relevant components. The sensor will sense the EMG signals from the targeted muscle group, the Arduino will convert these signals to analogue values and eventually send in the commands to linear actuator for execution. If successful, affordability and reliability will be maximum, making sure such a high-end product is available for the masses.