

**IZTECH ME401 Project Proposal****Advisor(s):** Assoc Prof Dr Senay Mihcin Prof Dr Serhan Ozdemir**Project title:** Rehabilitation device for a dropped foot problem.**Number of groups:** 1-3**Number of students in each group:** (ideally 3 to 5 people) 4**Is the project within the scope of Co-Op Extended?:** no**Project Background:**

Foot drop, sometimes called drop foot, is a general term for difficulty lifting the front part of the foot. If you have foot drop, the front of your foot might drag on the ground when you walk. Foot drop isn't a disease. Rather, it is a sign of an underlying neurological, muscular or anatomical problem. The most common cause of foot drop is peroneal nerve injury. This nerve is also called the fibular nerve is a branch of the sciatic nerve. It supplies movement and sensation to the lower leg, foot, and toes. Conditions that affect the nerves and muscles in the body can lead to foot drop. This problem might effect the quality of life of the patient, and requires rehabilitation.

**Project Objective:** Students should design a device which will assist the performance of the patient. They might utilize Functional electrical stimulation by programming with using the signalling patterns from the healthy foot.

A portable, economic easy to use exercise device to improve the muscles, and assist the patient use it on their own at home could be a feasible solution.

An exercise device with controller providing FES to the patient to rehabilitate the muscles, and provide a validation by assessing the performance of the patient while walking is required.

**Project Design Criteria:**

Please list measurable and non-measurable criteria that would be useful in evaluating the success of the project.

- Conceptual Design
- Real design
- System assembly
- Performance evaluation of the system ( Verification)
- Application to the patient
- Assessing the rehab performance of the patient after 10 sessions

**Expected Outcomes:**

Please describe the expected outcomes or deliverables (physical or theoretical) of the project.

Rehabilitation device must be designed, produced and tested successfully.

**Sustainable Development Goals:**

Please describe any potential impact on the field or society. You may want to reference the UN SDGs.

(<https://sdgs.un.org/goals>)

Electrical safety checks must be completed and any break down issues must be documented to maintain the device.

**Literature Survey Subjects:**

Please list fundamental research topics to guide students. There should be as many different subjects as the number of people in a group.

- Foot drop problem
- Possible solutions in literature
- Use of FES, and any other rehab devices
- Design criteria for the rehab robot.

**Please write your notes below, which you find useful for students to know about the project.**

You can set criteria such as min. GPA of each student or min average GPA of the group.

Any student who finds this project should come and speak to the supervisors.