IZTECH ME401 Project Proposal

Advisor: Prof. Dr. Gökhan Kiper

Project title: Design of manual olive harvesting machine

Number of groups: 1

Number of students in each group: 5

Is the project within the scope of Co-Op Extended?: No

Project Background: Türkiye is among top olive producers in the world. In recent years olive farmers have a hard time in finding the necessary labor for harvesting. Machines of various types and sizes are used in olive harvesting. The aim of this project is to design a battery operated manual olive harvesting machine. The machine should be carried by a person, typically have an end-effector at the tip of a telescopic boom and have a battery (either carried by person or placed on ground with a long cable).

Project Objective:

- To design a manual olive harvesting machine that is efficient and light-weight

Project Design Criteria:

- Minimum boom length: 2 m
- Telescopic boom with at least 2 stages
- Maximum mass without battery: 3 kg
- Motor power: at least 250 W
- Cable connection to 12 V or 24 V battery
- Harvesting capacity: ≥80 kg per hour

Expected Outcomes:

- Detailed design, a full-scale prototype and tests of manual harvesting machine

Sustainable Development Goals:

The project aims to increase olive harvesting efficiency. The project is related to SDG2 (Zero hunger) via target 2.4 (By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality) and 2a (Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries)

Literature Survey Subjects:

- Conditions of olive farms in Türkiye (tree types, capacity, terrain info, planting distance, etc.)
- How to prepare an olive farm for machinery harvesting (pruning, ground, etc.)
- Oil harvesting techniques (manual and/or machinery) - types, properties, operations, etc.
- Mechanical properties of manual olive harvesting machines (end effector types, vibration frequency, duration, materials used, etc.)
- Properties of power feed of manual olive harvesting machines (battery type and properties, power feed hardware, etc.)

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

The students should have a good background (grade CC or higher) of theory of machines.