**2019-2020 BAHAR DÖNEMİ ENGINEERING PROJECT KONULARI**

1. Numerical Analysis of Flow Area Optimization in PEM Fuel Cells
2. Mechanical Characterization of Different Types PLA Filaments
3. Design and Production of an Automatic Solar Panel Cleaning System
4. Design and Manufacture of a Stair Climbing Electric Wheelchair
5. Design of a Pedal Assisted Electric Quadricycle
6. Design and Manufacture of a 3D Filament Production Machine
7. Automatic Fire Extinguishing System Design for Buses

**PROJE KONULARININ AÇIKLAMALARI**

1. **Numerical Analysis of Flow Area Optimization in PEM Fuel Cells:** The fuel used in the fuel cells is delivered to the system through the channels of the bipolar plates, thereby allowing electrochemical reactions to occur. Therefore, fuel savings and optimum efficiency are directly related to the flow rate at which hydrogen fuel used in fuel cells is sent to the system and the type of flow area of bipolar plates. In this project, different flow area types and different flow rates will be created by using COMSOL Multiphysics package program and numerical studies will be carried out to improve the use of active area with changes to traditional flow areas.
2. **Mechanical Characterization of Different Types PLA Filaments:** In this study; tensile, notch impact and hardness measurement test samples will be printed in 3D printer using different types of filaments (ABS, PLA, PET, PETT, Nylon, PVA, Sandstone, Wood, Metal, HIPS, Magnetic Iron, Conductive, Carbon Fiber, TPE, Glow in the Dark, Amphora etc.) and required mechanical tests (tensile, notch impact, hardness etc.) will be performed to measure strength and flexibilities of different type of filaments **(During this project; student has to be in Adana for speciment manufacturing and mechanical tests).**
3. **Design and Production of an Automatic Solar Panel Cleaning System:** In Turkey, the number of solar power plants is increasing rapidly every day. However, due to the lack of infrastructure, solar panel surfaces are dusted and their efficiency decreases. Therefore, there is a need of an automatic cleaning system for the solar panel surfaces. A prototype working model will be manufactured and tested within this project.
4. **Design and Manufacture of a Stair Climbing Electric Wheelchair:** The biggest problem of our disabled citizens is the fact that the pavements in our country are non-standard and in some places there are stairs instead of ramp and they cannot use their standard wheelchairs effectively. In this project, it is aimed to design an electric wheelchair which can go up and down stairs and pavements and at the same time can be driven smoothly under bad road conditions (sand, soft ground etc.). A stair climbing electric wheelchair will be designed and manufactured within this project.
5. **Design of a Pedal Assisted Electric Quadricycle:** The quadricycle is a European Union vehicle category for four-wheeled microcars, which allows these vehicles to be designed to less stringent requirements when compared to regular cars. Quadricycles are defined by limitations in terms of weight, engine power and speed.The quadricycle classification was officially created in 1992, when the European Union published Directive 92/61/EEC which decreed that quadricycles fell into the same category as mopeds. In 2002, Framework Directive 2002/24/EC then refined this definition by distinguishing between light and heavy quadricycles (L6e and L7e categories).A light quadricycle (L6e) will be designed.
6. **Design and Manufacture of 3D Filament Production Machine:** The aim of the project is to provide low cost filament production by the mix of recycled filaments and pure thermoplastic materials. For this purpose, a new generation filament production machine will be designed and manufactured which will enable the reuse of waste filaments and plastics by breaking them and free of production processes that may negatively affect filament properties during the filament production.
7. **Automatic Fire Extinguishing System Design for Buses:** In Turkey, bus fires can never be extinguished without the bus being completely blown. Unfortunately, the existing automatic fire extinguishing systems cannot perform their duties properly. A new and technologically developed automatic fire extinguishing system is required. A new generation of automatic fire extinguishing systems are required for buses. An automatic fire extinguishing system will be designed and a prototype will be manufactured within this project.

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