

# Electrical/Computer Engineering Design Project Proposal

**Title:** Electronic Load System for Renewable Power Applications

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## Description

This project targets the design and development of a dynamic electronic load system. The objective is to successfully reproduce the electrical behavior of a configurable DC and AC loading condition (linear and non-linear). The system will be employed as a tool/instrument for test and measurement of renewable power applications. A conceptual block diagram of the system is presented in Fig. 1, where 3 components can be identified: generator interface, arbitrary waveform generator, and load power stage.

The system should include a software user interface for pre-programming the type of loading condition and dynamic loading evolution. The user interface should be capable of downloading the parameters to the arbitrary waveform generator using a USB protocol. In order to emulate the behavior of actual loading conditions, the waveform generator should run the pre-programmed sequence to drive the electronic load power stage.

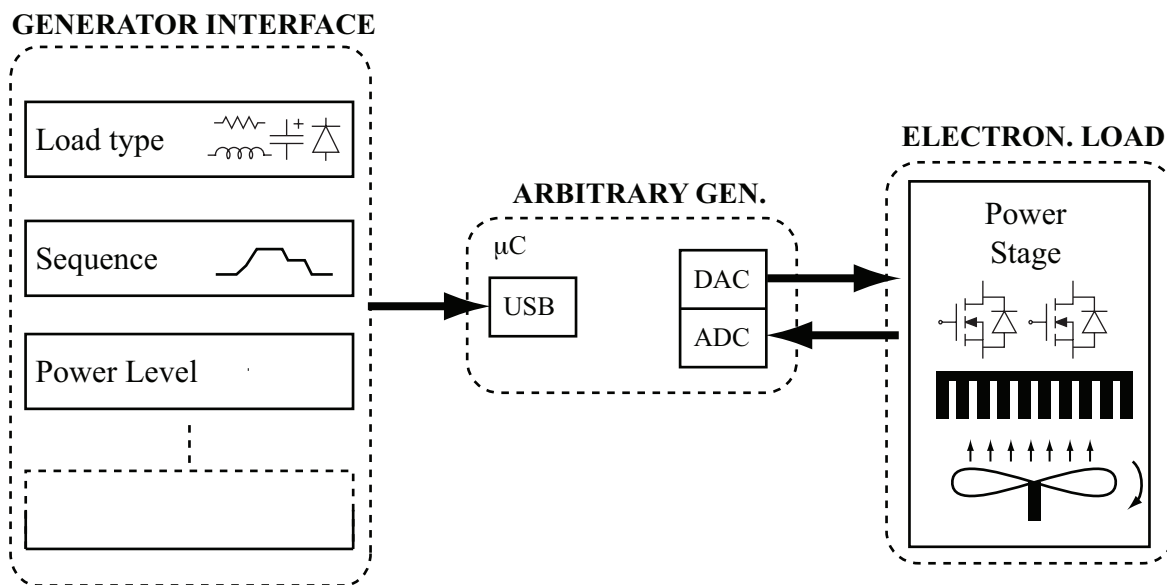


Fig 1: Conceptual block diagram of the Electronic Load System for Renewable Power

## Roles

The proposed project requires a team of 3 students (Electrical or Computer Engineering). The team will be responsible for coordinating the tasks and ensuring the successful integration of the system.

### Member #1

Systems modeling and user interface designer. Responsible for designing a computer based platform to process the type of loading condition and sequence. Design of user-friendly interface to configure and monitor the electronic load. Implement and organize case scenarios and generate combination of scenarios.

#### Member #2

Embedded system developer. Responsible for designing and developing a real-time waveform generator. Establish a robust communication protocol, store information in a memory, and perform precision D/A and A/D conversion. Program methods to compute the sequence of the dynamic loading system in real-time with line synchronization.

#### Member #3

Embedded system developer. Responsible for designing the power stage of the electronic load. Develop a strategy to measure and protect the power stage under different operating conditions. Integrate the power stage with the rest of the system.