INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	*Siemens Energy Inc.*	**Date Submitted**	*05/16/2022*
Project Title	*Design of an Automated Actuator Testing System* **(SIEM_ACTUATOR)**	**Planned Starting Semester**	*Fall 2022*

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

Discipline	Number	Discipline	Number
Mechanical	3	Electrical	1
Computer	1	Systems	

Company and Project Overview:

Siemens Energy Inc. is responsible for manufacturing and servicing of steam and gas-powered turbine units and auxiliary systems. The company is the OEM supplier for power generation customers within and outside the U.S.A., dealing with both nuclear and fossil fuel units.
This project will be conducted in the Small Assembly & Machining department of the Steam Turbine division. This department is responsible for service refurbishment and manufacturing of steam turbine valves, which are primarily involved with supplying steam to the turbine and re-heat units.

This project involves creating a testing system software (or simplified OS) that will be used for operational testing of hydraulic actuators used for valve assemblies.

Project Requirements:

- The project will involve designing a software that will be used for operational testing of large hydraulic actuators. The actuators are 3-4 ft. in length on average and operate between 2000 to 3000psi.
- The software will be expected to acquire data from the sensors attached to the test stand

and exhibit the output in a simplified manner on a touchscreen (preferably HD).

- The software will also be able to take inputs from the user interface like starting or stopping the test, emergency stop, selecting test modes, etc.
- There are different test modes for different styles of actuators which will need to be setup in the system. It is expected that the software be customizable to the point that these modes can be set up by the end user using the front-end, including testing parameters.
- The testing computer will be kept in an ergonomic cabinet which is expected to be designed by a student as well.

Expected Deliverables/Results:

- The above is a basic idea of what the system may look like, however, based on the discussion during the term of the project, the scope can be changed based on feasibility and opportunities for improvement.
- A functional software and updated computer system that collects data (pressure, temp., flow rate, etc.) from the testing rig and has a simplified front end.
- The user interface should allow addition of test modes and customization of critical parameters based on the product being tested.
- Ergonomic stand to contain and use the testing computer.

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Machine design
- Hydraulic actuation and systems
- Sensors
- Basic to intermediate Circuit board and wire harness design
- PLC
- Software designing