Design of Electrical Engineering Systems

Spring 2023

Syllabus/Expectations

- You will work individually/with a team of other Senior Design students on a capstone project whereby **you will utilize all the knowledge you have learned in the course of your degree and apply it to a specific problem.**

- **All students in a group are expected to contribute to the group effort.**

- While not every person can work on every aspect, there should be enough tasks for the given groups size to allow for enough tasks that **each member can contribute to the success of the whole project**. During the final formal presentation of the project, **every group member is expected to have a speaking role**.

- Projects will vary from individual to individual, group to group, and from semester to semester. Typically, projects will be defined by instructor.

Individual & Group Deliverables:

- ❑ A **final formal written report** (required contents to be posted later)
- ❑ A PowerPoint (or other slide) presentation for a **15-minute presentation** of your project.

- ❑ There will be a **mid-semester preliminary report** of the work you have done on your project
- ❑ Parts of this document will **become sections in your final report**

- ❑ Deliverables could include **working prototype**, **notebook**, **electrical circuit**, **developed code**, **simulation results**, and-or **peer reviews**. The specifics of this item will depend on the project.

- **Grading Policy**

  Status Report 20%

  Final Presentation 40%

  Project Formal Report 40%

- Final Presentation will be graded by an EE faculty panel both on style as well as content.

Letter Grades will be assigned according to the standard 10% levels.

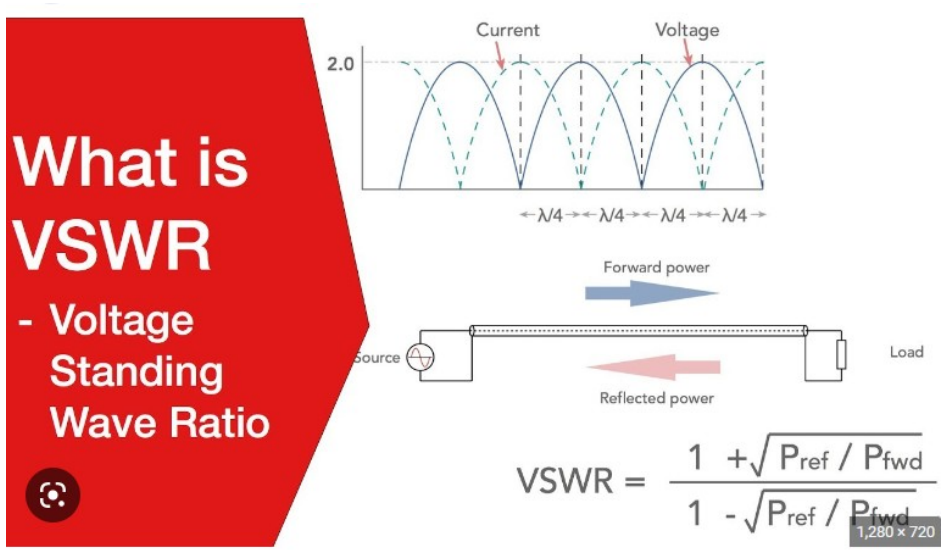
Suggested Projects

- **Automation of VSWR measurements at a Remote Antenna Site**

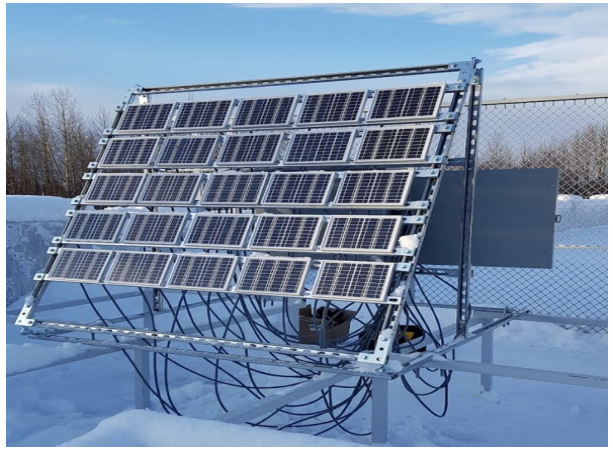
- **Client: UAA Alumni, FAA**

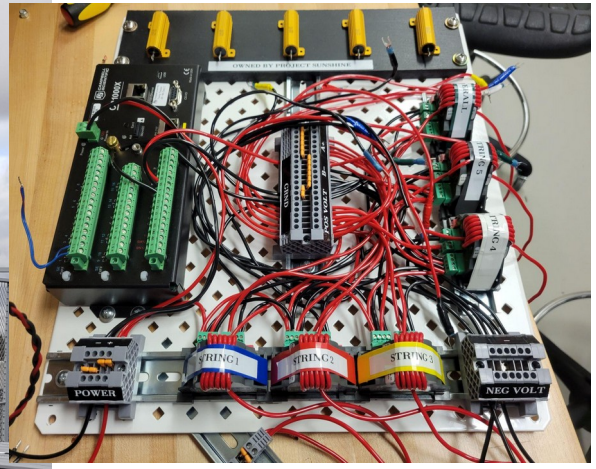
Using

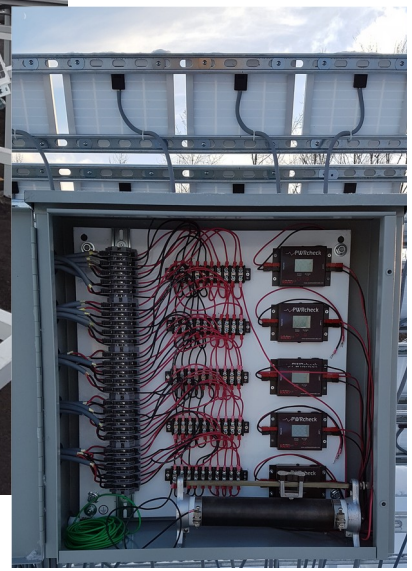
- **LabVIEW**
- **Portable Network Analyzer**

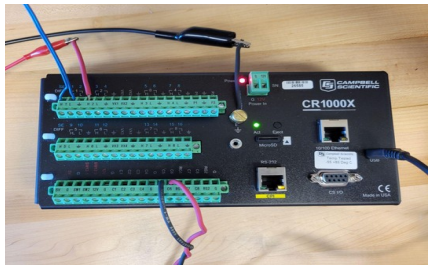


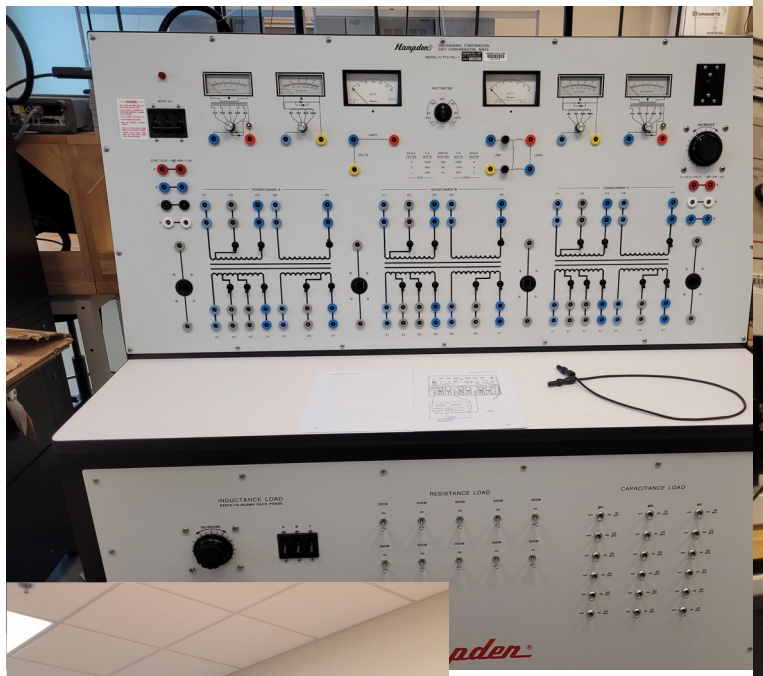
❑ Data Logging Implementations for Optimizing Total-Cross-Tied Photovoltaic Arrays

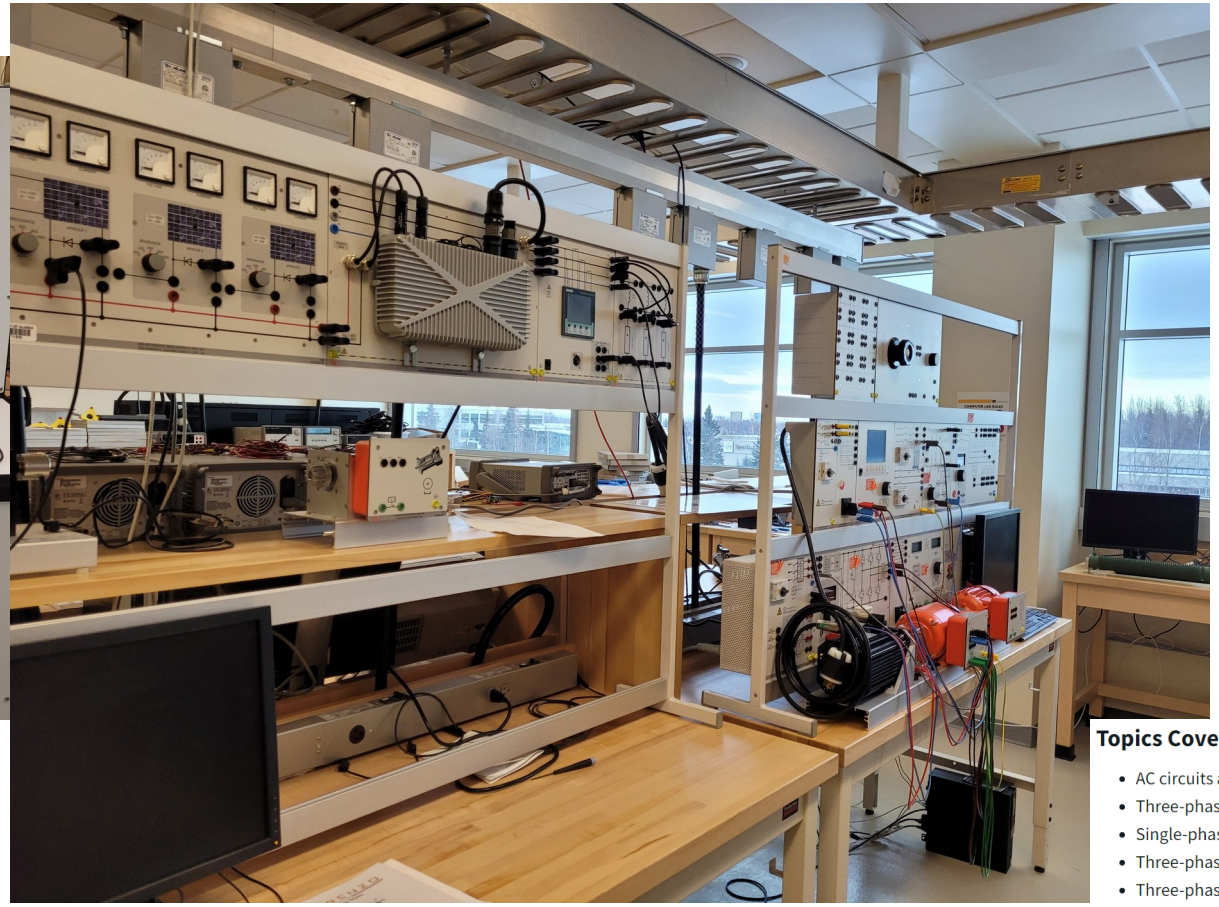


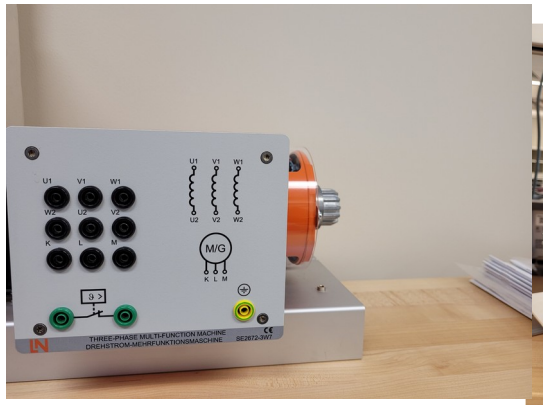


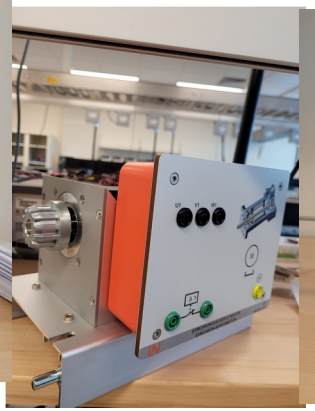












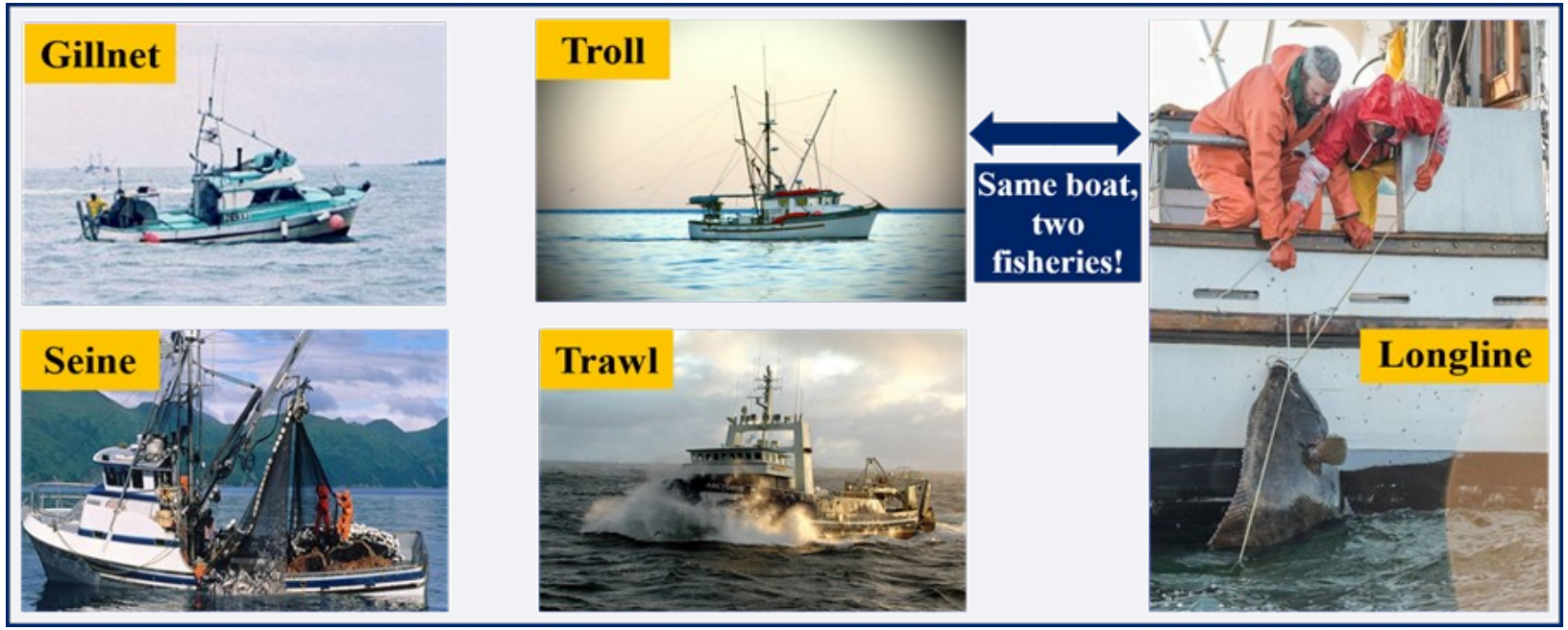
❑ Design an Electrical Machine and Transformer Lab

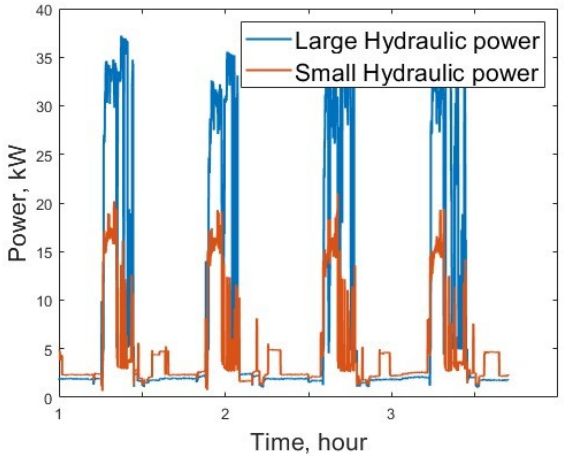
Topics Covered

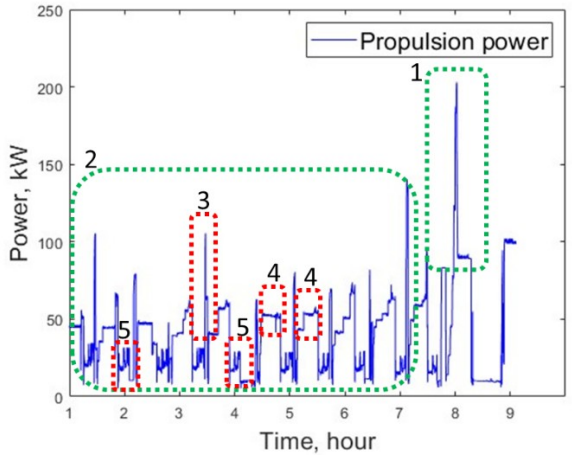
- AC circuits and phasor analysis
- Three-phase circuits and power measurement
- Single-phase transformer
- Three-phase transformer
- Three-phase induction machine (equivalent circuit model)
- Three-phase induction machine (mechanical characteristics)
- Single-phase operation of the three-phase induction motor
- Single-phase induction motor
- Three-phase synchronous machine (generator regime, equivalent circuit model)
- Three-phase synchronous machine (motor regime, V-curves)
- Three-phase synchronous machine (generator regime, parallel operation)
- Frequency-control of the three-phase induction motor

- **Power Consumption Characterization of Fishing Fleet**

- **Contribute to a paper on this topic**







Thank You