



# ELab Syllabus & Outcomes

## **Lab1: Introduction to ECI, and the Applications & Trends in Marine & Power Systems**

Introduce the ELab topics, and organize students into lab teams.

Learn and evaluate electronic information search methods and library resources.

Develop teamwork and communication skills.

## **Lab2 & Lab3: Electronics Measurement Hardware and Analog Signal Processing**

Introduce and operate basic lab measurement and power supply equipment.

Build and test basic breadboard circuits.

Present the topic selected for the team application project.

## **Lab4, Lab5 & Lab7: Passive Electronic Circuits and Signal Converters**

Read and understand circuit diagrams using passive, analog electronic components.

Build and test breadboard circuits including:

1) voltage dividers, 2) wheatstone bridges, and 3) a variety of passive filters.

Calibrate and plot fundamental, physical relationships between inputs and outputs (I/O).

## **Lab6: Emerging Applications & Trends in Marine & Power Systems: Student Presentations**

Research the emerging technologies in the Marine and Power industries.

Understand relevant applications of Electronics and Computer-integration.

Develop technical writing, communication and presentation skills.

Evaluate performance in peer-to-peer comparisons.

## **Lab8 & Lab9: Active Electronic Circuits and Signal Converters**

Understand the operation and wiring of a 741 operational amplifier (op-amp).

Read and understand circuit diagrams using active, analog & digital components.

Build and test breadboard circuits including:

1) amplifiers, 2) isolators, and 3) a variety of active filters.

Calibrate and plot fundamental, physical relationships between inputs and outputs (I/O).

## **Lab10, Lab11 & Lab12: Ladder Logic Circuits & Digital PLC's**

Understand the operation and wiring of multi-contact, electro-magnetic relays

Read and understand ladder logic circuit diagrams for discrete-state control.

Build and test breadboard circuits including a variety of components including NC & NO pushbuttons, and LED's in an ON/OFF controller application.

Test and evaluate basic transistor switching circuits.

Learn and implement PLC Ladder programming on a personal computer.

Program and implement a Ladder Logic controller application with a TECO PLC unit.