

- 1 Fish Tank Project
  - Understand the broad goals of the fish tank project
  - Understand the goals and expectations of the class
- 2 Fabrication of Platform
  - Understand the different techniques used.
- 3 Introduction to MATLAB
  - Be able to plot simple data sets with MATLAB
  - Be able to perform simple statistics and plot histograms in MATLAB
  - Be able to perform curve fitting in MATLAB for linear, polynomial, exponential, and power curve fits.
- 4 Salinity sensor
  - Be able to describe the electrochemical reactions responsible for the change in electrical conductivity with salt concentration
  - Be able to describe the calibration procedure for the conductivity sensor
  - Be able to compute the mean, median, and standard deviation of a data set using MATLAB
  - Be able to explain the setup of the electrical circuit to power the conductivity sensor
- 5 Analysis of mass balance for batch processes
  - Be able to write the mass balance equations for batch processes.
  - Be able to use a systematic procedure to solve batch mass balance problems.
- 6 Circuits for solenoid actuation
  - Be able to identify the components in a cascade control circuit
  - Be able to describe the purpose of the flyback diode on a relay coil or solenoid valve.
  - Be able to explain the sequence of events that occur when a relay coil is powered
  - Be able to identify the different types of relays (SPST, SPDT, DPST, and DPDT) and explain their operation

Be able to assemble the cascade switching circuit for solenoid valves on the fish tank platform

7 Salinity control

Be able to describe the role of UCL and LCL in the control algorithms.

Be able to describe how to compute UCL and LCL

Be able to describe and distinguish the terms, setpoint, deadband and deadtime

Be able to describe a procedure for measuring deadtime

Be able to describe what variables are involved in determining the proportional control response

8 Arduino

Be able to write and use user defined functions

Be able to write and use for loops, if/else statements

Be able to use the main built-in functions