**Outcome:** Students will demonstrate their ability to review and explain various process systems utilizing the process PFD’s and P&ID’s. They will demonstrate their ability to research and write a basic process description, identify and explain the function and reason for the various control loops and determine the critical control parameters. This competency will introduce the students into Failure Modes and Effects Analysis/Hazardous Operations Analysis (FMEA/HazOP) evaluations.

**Lecture/Demo:**

1. Instructor lead discussion on process systems.
2. Simtronics SPM-1600 Feedback/Cascade Process Model
   1. Exercise #1 Normal Operation
      1. Writing a process description from the PFD or P&ID.
      2. Identifying control loops & their function.
      3. Determining the critical control parameters.
      4. FMEA/HazOP of this process model.
         1. Introduction to the “What-if” exercise.
3. Simtronics SPM-1600 Feedforward with Feedback Process Model
   1. Exercise #1 Normal Operation
      1. Writing a process description from the PFD or P&ID.
      2. Identifying control loops & their function.
      3. Determining the critical control parameters.
      4. FMEA/HazOP of this process model.
         1. Introduction to the “What-if” exercise.

**Lab/Homework:**

Location: Simtronics lab

1. Simtronics SPM-310 Blending Tank

**Documentation:**

1. Simtronics SPM-1600
2. Simtronics SPM-310

**Assessment:**

1. Homework
2. Lab Work
3. Lab Safety
4. Quiz(s) & Final Exam

**Homework Details**

You and a partner will collaborate on researching and writing a position paper and presentation for the SPM-310 process.

Your position paper will include the following:

* A process description
* A detailed description of the various control loop/strategies.
* A list of the critical process variable(s) or a ranking of their criticality.
  + Provide your reasoning
* Create and complete a “What-if” exercise spreadsheet.

Presentations & critique should take approximately 15 minutes (give or take).

The paper and presentation will be due on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Grading Details**

The paper and presentation will go towards 150 points (paper: 110 & presentation: 40)

Grade Breakdown:

* **\_\_\_/50 points:** For the accuracy and completeness of the process description.
* **\_\_\_/20 points:** For the accuracy and completeness of the various control loop/strategies.
* **\_\_\_/20 points:** For the accuracy and completeness of the criticality ranking
* **\_\_\_/10 points:** Questions: How could the process control be improved? Why?
* **\_\_\_/50 points:** Presentation content, presenter effectiveness, neatness, and organization
* **EXTRA CREDIT:** (available after the base assignment is completed with a score of 70% or better)
  + There are 23 active devices depicted on this process display; for each of the devices list their possible failure modes, the effect of the failure and possible consequences.
  + 5 points per device available.
    - Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Score: \_\_\_\_\_\_\_\_
    - Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Score: \_\_\_\_\_\_\_\_