**Outcome:** Recognize and understand how to manipulate Manual, Automatic and Cascade Control systems

**Lecture:** Lecture to review: Manual, Automatic and Cascade control loops with process gain, Integral, and Derivative - PID Control Tuning

**Demo:**

1. Hands on Hot Unit.

**Lab:**

1. Location: HOT Unit (GRHS)
2. Students Will Demonstrate how to manipulate a manual control system on the skid (Hot Unit) and on the DCS creating the recognition between Field and Remote-Control system dynamics.
3. Students Will Explain how to manipulate an Automatic Control system on the skid (Hot Unit) and Demonstrate how to manipulate an Automatic Control system on the DCS creating the recognition between Field and Remote-Control system dynamics.
4. Students Will Explain how to manipulate a Cascade Control system on the skid (Hot Unit) and Demonstrate how to manipulate a Cascade Control system on the DCS creating the recognition between Field and Remote-Control system dynamics

**Documentation:**

1. Skid (Hot Unit) overall P&ID
2. Reinforce students control knowledge through demonstration of hands on skills during Hot Unit Modules.

**Competency Mastery:**

Students will demonstrate Mastery by Explaining each type of Control Scenario, and showing the instructor which loops are manual, auto, and cascade on the P&ID, on the Skid (in the Field) and on the DCS (Remote Distributed Control System) and describe how and why changes will happen when each type of control is manipulated comparing and contrasting the difference in changes based on the different types of Control attributes. Students will also master Competency through demonstration of hands on skills during Hot Unit Modules.