**Outcome:** The students will be able to recognize, read, and communicate utilizing the distinct types of process documentation including Process Flow Diagrams (PFD’s), Piping and Instrument Diagrams (P&ID’s), and Logic Diagrams. The students will demonstrate their understanding of the documentation and ability to draw or modify the documentation utilizing the correct symbology. The students will be introduced and become familiar with basic electrical and hydraulic schematics.

**Lecture:** Lecture to review:

1. Process Flow Diagrams (PFD)
   1. Purpose
   2. Level
      1. Plant-wide PFD
      2. Unit PFD
   3. Types
      1. Block
      2. Symbolic
      3. Pictorial
2. Piping and Instrument Diagrams (P&ID)
   1. Purpose
   2. Symbology
      1. Process equipment (e.g., heaters, vessels, tanks, etc.)
      2. Instrumentation (e.g., control valves, transmitters, controllers, etc.)
      3. Rotating equipment (e.g., pumps, fans, compressors, etc.)
      4. Piping, valves, and fittings
3. Logic Diagrams
   1. Purpose
   2. Symbology
      1. Traditional
      2. Modern
   3. Functions
      1. and, or, inverse, not, etc.
4. Electrical Schematics
   1. Purpose
   2. Types
      1. One line
      2. Ladder diagram
   3. Symbology
5. Hydraulic Schematics
   1. Purpose
   2. Symbology

**Demo(s):**

1. None

**Lab:**

1. HOT Unit (GRHS)
   1. Use HOT unit P&ID to locate and identify various equipment
2. Small System Lab (ICC)
   1. Design, build and test various logic scenarios or sequences utilizing the ICC logic trainer.

**Homework:**

1. Students are required to use the proper symbology in all discussions and documents.
2. Fundamentals of Process Control
   1. Murrill – Third Edition
      1. Appendix A
3. Industrial Electricity & Motor Controls
   1. Miller & Miller

**Documentation:**

1. PFD Lecture .ppt
2. P&ID Lecture
   1. ISA S5.1-2009
   2. Hot unit P&ID
   3. MP P&ID
   4. BPC P&ID
3. Fundamentals of Process Control
   1. Murrill – Third Edition
      1. Appendix A
4. Industrial Electricity & Motor Controls
   1. Miller & Miller
5. IPT Industrial Hydraulics Handbook
   1. Archer - 2001

**Assessment:**

1. Homework
2. Lab Work
3. Lab Safety
4. Hands-on observation
5. Quiz(s) & Final Exam