**H.S. Summer Working Connections*-* Intro to Mechatronics**

**Location:** Florida State College Jacksonville Room:

**Dates:** July 24 – 28, 2017

**Instructor:** Prof. Tim Callinan

**Notes:** Lunch (12:30 – 1:30) will be provided by FSCJ.

**Monday, July 24th - 9am – 5pm**

Objectives:

1. Characterize the fundamental components of a mechatronics system and demonstrate an example of a functioning system.

2. Describe the various mechatronics curriculum certifications.

Topics

* Introductions
* Plan for the week
* Discussion/Introduction on mechatronics.
* Discuss the mechatronics certifications at each college. (Give them a history & background)
* Explain the objectives of the NSF Collaborate grant
* Introduction to the Low Cost Trainer (Give them a demonstration on it)
* Discussion on Mechatronic Components – PLCs, Pneumatic Cylinders, Pneumatic DCVs, Sensors (Break them up into groups)
* Mechatronic Systems Block Diagram (Will need the 3 NSF trainers for this)
* Inputs & Outputs of a Mechatronic system
* Homework or Research

**Tuesday, July 25th- 9am – 5pm**

Objectives:

1. Explain the difference between AC and DC power and demonstrate the use of test equipment used to measure voltage and current.

2. Design and construct a basic electrical circuit.

3. Characterize the main components of a PLC system and construct a basic program.

Topics

* Overview of AC & DC electrical power
* Basic electrical circuits (Use power supply, Push Button & Light tower)
* Use of the multi-meter to measure voltage
* Explain concept of voltage & current
* Overview of PLC’s and CLICK PLC software
* Installing the CLICK PLC software
* Wiring inputs (pushbuttons) & outputs (light tower) to a PLC
* Introduction to ladder logic programing / downloading programs to PLC
* Programming basic ladder logic programs

**Wednesday, July 26th- 9am – 5pm**

Objectives:

1. Develop more advanced PLC programs using ladder logic.

2. View an actual manufacturing facility that uses mechatronic systems.

Topics:

* Practice with more ladder logic programs
* Introduction to DC motors and Relays
* Turning on a DC motor using a PLC and Pushbuttons
* Using the light-tower, DC motor, push-buttons & PLC in a full system
* Field trip to a local manufacture (Anheuser-Busch?) in Jacksonville

**Thursday, July 27th- 9am – 5pm**

Objectives:

1. Understand the role of (electro) pneumatic components in a mechatronic subsystem.

2. Demonstrate the operation of pneumatic components in a mechatronic subsystem.

3. Understand the basic steps in troubleshooting a mechatronic system.

Topics:

* Introduction to Pneumatic components
* Cylinders, Directional Control Values, Pumps, Flow Control
* Building a simple Pneumatic circuit
* Difference between pressure & flow
* Interfacing Pneumatic circuit with PLC
* Teachers will have to complete a small mechatronic project
* Introduction to mechatronic troubleshooting

**Friday, July 28th- 9am – 5pm** Discussion on how to build a low cost trainer

Objectives:

1. Identify the parts and processes required to build a “low cost” mechatronics trainer to be used in the classroom.

* Equipment required to build the trainer (3D Printer, drills, tools, etc)
* Drawings / Parts Lists / Resources available
* Overview on videos/drawings to be provided on building the trainer
* Questions / Survey