Division: Technical
Subject Code: ELME   **Course: 225**
Course Title: Computer Integrated Manufacturing Systems and PLC III

Thaddeus Stevens College of Technology

Master Course Form

Catalog Description: This course guides the student through the processes of interfacing and integrating manufacturing components and unit operations into useful systems. The student will work with a touch screen display (HMI) networked to a Programmable Logic Controller. System integration will be accomplished using digital I/O, Device net, and TCP/IP Ethernet networking. The course involves working with a flexible manufacturing lab that includes a bar code reader, vision system, servo, and AC drive to manipulate a conveyor and other equipment to sort and fill.

Digital Description:

- Credit Hours: 4
- Lecture Hours: 3
- Lab Hours: 3

Minimum Grade Required: D

Prerequisites:

- ELME 215 – Industrial Robotics and Motion Control
- ELME 208 – Programmable controlers 2

Course Objectives:
   Upon completion of this course, the student will be able to:

   1. Demonstrate an understanding of AC drives and interfaces
   2. Apply Human Machine Interface design and integration
   3. Create a PLC programming and I/O application
   4. Test Servo control
   5. Configure Machine vision
   6. Apply a bar code reader to a machine application

Learning Outcomes:

As a consequence of the classroom and lab experiences , the student should be able to:

   1. Explain function and operation of AC drives.
   2. Know how to program AC drives
   3. Explain Ethernet Communication
   4. Interpret PLC Programming Language - Control Logix
   5. Configure Network Communications

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6. Interface a PLC – Controlled Conveyor and Sensors
7. Explain Sorting process
8. Explain Filling Process
9. Design a HMI Touch screen application
10. Updating a HMI touchscreen
11. Configuring a Bar code reader
12. Use Machine Vision System Software
13. Configure the vision project for inspection
14. Tune a Digital Servo Drive
15. Test a Digital servo Drive
16. Use the Bar code reader with a flexible Manufacturing System
17. Trouble shooting the Flexible manufacturing System

Planned Sequence of Learning Activities:

- Introduction to Manufacturing
- Operating a Flat-belt Conveyor
- Feeding and sorting Parts into containers
- Configuring and wiring sensors, buttons, indicator lights
- Touch Screen Programming
- PLC Programming CompactLogix
- Servo Control
- Barcode Reader
- Machine Vision System
- Trouble shooting

List of Texts, References, Selected Library Resources or other Learning Materials:

Lab volt flexible Manufacturing System

Prepared by: Art Jackson   **Date: 2/6/2015**