

Course Outline for: VACT 1301 I/O for Vacuum System Automation**A. Course Description**

1. Number of credits: 1
2. Lecture hours per week: 1
3. Prerequisites: VACT 1300
4. Corequisites: None
5. MnTC Goals: None

Complex automation systems are assemblies of many basic automation components called inputs and outputs (I/O). Communication between I/O components occurs using electrical signals. Remote I/O is used to gather these signals and make them available for programming system operations and/or visualization using a Human Machine Interface (HMI). In this class we will look at common I/O devices and how they can function together to make an automated vacuum system.

B. Date last reviewed/updated: May 2023**C. Outline of Major Content Areas**

1. Basic Electrical Measurements
2. Standard Input and Output Signals (I/O)
3. Remote I/O Devices
4. Human Machine Interfaces (HMI)

D. Course Learning Outcomes

Upon successful completion of the course, the student will be able to:

1. Use a digital voltmeter to measure electrical signals.
2. Identify input and output types.
3. Wire inputs and outputs to a remote I/O device.
4. Create a simple HMI to display information from a device and drive operations to a device

E. Methods for Assessing Student Learning

Methods for assessment may include, but are not limited to, the following:

1. Unit quizzes
2. A summative exam
3. Homework assignments
4. Discussions
5. Collaborative projects
6. Other quizzes

F. Special Information

This course is the second of 3 modular 1-credit courses VACT 1300 (Intro to Vacuum System Automation), VACT 1301 and VACT 1302 (Vacuum System Automation Capstone).

Course instruction includes access to I/O components, a data acquisition unit, data acquisition and HMI application, and basic multimeter unit.