

Virginia Western Community College

ETR 238

Industrial Electronics II

Prerequisites

ETR 237- Studies linear integrated circuits for industrial applications, motors, industrial control devices, power control circuits, transducers, industrial process control, and sequential process control.

Corequisites

None

Course Description

Studies industrial applications, motors, industrial control devices, power control circuits, transducers, industrial process control, and sequential process control. Teaches techniques for conducting site surveys, installing system components, installing inverters and performing system sizing and system maintenance. Introduces different battery configurations, and charge controllers. Introduces safety, system design and layout, National Electric Code, Component Selection, wiring and installation techniques.

Semester Credits: 4 Lecture Hours: 3 Lab Hours:3

Required Materials

Textbook:

Electric Motors and Control Systems by Frank Petruzella ISBN 978-0-07-352182-4

Software:

National Instruments MultiSim (all software available in the VWCC Computer Labs). Free access to the software will be provided by the school.

Lab Volt simulation software for ElectroMechanical Systems, instructor provided

Other Required Materials:

Scientific Calculator required, must have natural entry. Examples include Casio fx-115ES PLUS, TI-36X, TI-84, TI-89(optional for EET's).

Course Outcomes

At the completion of this course, successful students will be able to

- Understand the general principles of motors, transformers and machine operation.
- Understand the importance of motor efficiency as well as various methods to improve efficiency.
- Understand motor notation symbology and control strategies, including voltage and frequency control.
- Understand the role of motor control circuits in power electronics
- Understand how to protect motors and prevent motor failure
- Describe, analyze, and test motor control circuits.
- Demonstrate programming and control of variable frequency drives
- Demonstrate control of multiple DC motor configurations
- Demonstrate control of Induction motors

Topical Description

- Review of AC and DC fundamentals
- Magnetism Principles (LHR,RHR)
- Motors and Generators
- Motor Construction /Nameplates
- Single Phase Motors
- Synchronous Motors
- Wound Rotor Motors
- Squirrel Cage Motors
- Controlling Motors
- Variable Frequency Drives
- Bearings, Alignment, Etc.
- Steppers and Encoders
- Servos and Encoders
- Motor Nameplate Identification

Notes to Instructors

Beginning Fall 2020, VWCC will require students to have a computer or reliable access to a computer, capable of participation in an online format. Online courses at Virginia Western require a significant amount of interaction with Canvas, the Learning Management System, and

many require real-time class sessions using the Zoom web-conferencing tool. To be successful in online classes, students must have substantial access to a computer with hi-speed internet connectivity. The expected requirements are listed on the college webpage.

Multisim software is provided on lab laptops. Multisim may allow an appended version for free student downloads.

[TITLE IX STATEMENT](#)

[ADA STATEMENT](#)