

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY MEC 140 – INTRODUCTION TO MECHTRONICS (3 CR.)

Course Description

Presents foundational concepts in mechatronics including analog and digital electronics, sensors, actuators, microprocessors, and microprocessor interfacing to electromechanical systems. Surveys components and measurement equipment used in the design, installation, and repair of mechatronic equipment and circuits. Prerequisite: divisional approval. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

General Course Purpose

This course is designed to teach the students the interdisciplinary fundamentals of mechanical and electrical systems, controls systems, computer control and logic and their integration into the design, operation, and control of modern smart systems. This course will teach students to successfully identify problems, design and optimize integrated solutions by focusing on modern mechatronics systems and best-practices in automated technology.

Course Prerequisites/Corequisites

Prerequisite: Department consent

Course Objectives

Upon completing the course, the student will be able to:

- a) Define mechatronics and its application to modern automated systems
- b) Explain the difference between analog and digital signals and examine analog and digital electronics in mechatronic systems
- c) Organize the operation and control of physical systems into tasks and states
- d) Examine the use of sensors that monitor and control the operation of mechatronic systems
- e) List the advantages of electrically powered actuators and select an appropriate actuator for a given mechatronic application
- f) Explain the difference between microprocessors and microcontrollers
- g) Examine the interfacing of microprocessors and microcontrollers to electromechanical systems.
- h) Examine measurement equipment used in the design, installation, and repair of mechatronic
- i) equipment.
- j) Apply safety precautions associated with mechatronic systems.

Major Topics to be Included

Critical attention will be given to the following topics:

- a) Mechatronics and enabling technologies
- b) Automated systems
- c) Digital and analog signals
- d) Semiconductors and digital circuits
- e) Microcontrollers/PC interfacing
- f) Control software
- g) Sensors and transducers
- h) Actuators: mechanical and electrical
- i) Power sources
- j) Electromechanical systems
- k) Design project