MASTER COURSE OUTLINE

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COURSE TITLE

Mechatronics III

GENERAL COURSE INFORMATION

Dept.: MCT	Course Num: 103	(Formerly:)
CIP Code: 15.0613	Intent Code: 21	Program Code: 640
Credits: 5		
Total Contact Hrs Per Qtr.: 66		
Lecture Hrs: 44	Lab Hrs: 22	Other Hrs:
Distribution Designation: General Elective (GE)		

COURSE DESCRIPTION (as it will appear in the catalog)

This (third) course in mechatronics will address the use of microcontrollers and microprocessors functioning with sensors and control systems. Students learn how to use and interface with a variety of physical world sensors. Using this knowledge, students will build several sensor projects and demonstrate a UAS, Rover, or other device as part of a team project.

PREREQUISITES

MCT 102 or MCT 120 (or concurrent enrollment)

TEXTBOOK GUIDELINES

Texts and equipment determined by MCT faculty (Make: Sensors: A Hands-On Primer on Monitoring the Real World with Arduino and Raspberry Pi, Karvinen & Valtokari; Make: Drones: How to Teach an Arduino to Fly, McGriffy)

COURSE LEARNING OUTCOMES

Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills.

1) Learn about a wide variety of sensors used in the field of mechatronics, understanding their key attributes and technologies
2) Describe how sensors are used in modern devices
3) Understand how sensor devices must necessarily convert the analog inputs of the physical world into the digital data required by microcontrollers and microprocessors
4) Construct, test and demonstrate team projects using a variety of sensors
5) Recall key modules used in the development of mechatronics control systems
6) Identify key sensors that must be used to enable UAS to fly or rove
7) Review the primary elements of UAS RF command, control and communications systems
8) Recall current software programming languages and applications used to support UAS
9) Create and test programs that enable UAS
10) Construct, test and demonstrate a UAS

INSTITUTIONAL OUTCOMES

COURSE CONTENT OUTLINE

1. The Role of Mechatronics in sensor status and control
2. Understand a variety of sensors: Distance, Smoke (gas), Touch, Movement, Light, Acceleration and Angular Momentum, Identity, Electricity, Sound, Weather and Climate, Camera
3. Learn to program and use sensors in a Mechatronics environment
4. Interface with sensors by building projects, checking power requirements, results, accuracy and reliability
5. Review basic RF Communications in 2.4GHz & 5.8GHz WiFi, Frequency Hopping, and Bluetooth, 3G, and 933Mhz LoRa Telemetry
6. Review of Modern Software Programs and Applications
7. Review sUAS Command, Control and Communications Systems
8. Construct, Program, and Preflight, Test UAS

DEPARTMENTAL GUIDELINES *(optional)*

The syllabus must contain evaluation/grading guidelines, class environment/expectations/rules, course learning outcomes, and a disability services statement. A schedule must be provided to students that contains content covered (text chapters, topics, etc.) and tentative test dates (to include final date/time).

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DIVISION CHAIR APPROVAL **DATE**