



## MASTER COURSE OUTLINE

Prepared By: Gary Baker

Date: February 2020

### COURSE TITLE

Mechatronics II

### GENERAL COURSE INFORMATION

Dept.: MCT

Course Num: 102

(Formerly: )

CIP Code: 15.0613

Intent Code: 21

Program Code: 640

Credits: 2-5

Total Contact Hrs Per Qtr.: 33-83

Lecture Hrs: 11-28

Lab Hrs:22-55

Other Hrs:

Distribution Designation: General Elective (GE)

### COURSE DESCRIPTION (as it will appear in the catalog)

This course is the second in the mechatronics series. It will address microcontroller programming, data acquisition, sensors, actuators, computer-aided design (CAD), automated manufacturing, and 3D printing. In this course, students will build (and keep) their own Creality Ender 3 Printer as well as design, print and build a variety of projects using open-source software and their own 3D printer. *This is a variable credit course where students can choose to enroll in 2 to 5 credits depending on their needs.*

### PREREQUISITES

None

### TEXTBOOK GUIDELINES

Texts and equipment determined by MCT faculty (Example: Programming Arduino: Getting Started with Sketches, 2/e, (2016), Monk; Practical Electronics for Inventors, 4/e, Scherz & Monk; Adafruit Arduino Circuit Playground; Arduino Starter Kit; Basic Electronics Tool Kit)

### COURSE LEARNING OUTCOMES

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

- 1) Describe status and control concepts and methods of measurement and instrumentation
- 2) Understand workings of microcontroller, microcontroller programming, microcontroller system design
- 3) Recognize and state methods of data acquisition, reaction, storage and analysis
- 4) Compare and contrast types of actuators, sensors, indicators, actuators, servos
- 5) Recall use of a wide variety of components, programs, test equipment, program design cycle and prototypes
- 6) Program, test, debug, use, read code, improve on code in current microcontroller system implementation
- 7) Understand and experience the basics of CAD and additive manufacturing

### INSTITUTIONAL OUTCOMES

IO3 **Human Relations/Workplace Skills:** Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills

### COURSE CONTENT OUTLINE

Module 1 (1 credit): Set-up 3D printer

1. Set up Ender 3 3D Printer
2. Explore Thingiverse

Module 2 (1 credit): Thingiverse 3D Print Projects

Module 3 (1 credit): TinkerCad 3D Design and Print Projects

Module 4 (1 credit): Fusion 360 Design and Print Projects - Basic

Module 5 (1 credit): Fusion 360 Design and Print Projects - Advanced

**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).

---

**DIVISION CHAIR APPROVAL**

---

**DATE**