MASTER COURSE OUTLINE

Prepared By: Gary Baker   Date: February 2020

COURSE TITLE

Introduction to Modern Technology

GENERAL COURSE INFORMATION

Dept.: MCT	Course Num: 100	(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 an introduction to technology studies, core mechatronics, and physical computing: the integration of electrical, mechanical, microcontrollers, computers, electronics, input/output, programmable logic controller (PLC), sensors and controls. This course will introduce students to the fundamentals of electrical, electronics, communications, firmware, software, sensors and computational theory, which form the foundation for future studies in mechatronics, simulations, robotics and industrial control systems through an introductory focus on microcontrollers, microcomputers and PLC software and devices. *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

Introductory electrical, electronics, communications and texts and equipment determined by faculty (Examples: *Programming Arduino: Getting Started with Sketches*, Monk; *Practical Electronics for Inventors*, 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, compare and recognize Microcontrollers, Microcomputers & Programmable Logic controllers (PLC), their history, costs, components and related firmware.
2) Program a variety of microcontrollers and microcomputers to perform basic tasks and choose the appropriate
3) programming language depending on the application
4) Explain the uses and applications of microcontrollers, microcomputers and PLCs
5) Describe different strategies for success in science, technology, engineering and math and develop a personal strategy and schedule that maximizes chances for success in college courses.
6) Create, edit and manage files, original documents, spreadsheets and presentations using free web-based applications

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) Introduction to Mechatronics. Success Strategies. Open-source applications and software
1. Introduction to Mechatronics
2. Academic Success Strategies
3. Goals and Time Management
4. Introduction to Open-Source Office Applications
5. Introduction to Circuit Playground Express and Raspberry Pi
6. Introduction to Open-Source Code Editing Software (MakeCode and Scratch)

Module 2 (1 credit) - Circuit Playground Express (CPX)
1. Introduction to Microcontrollers, Microcomputers and Programmable Logic Controllers (PLC)
2. Exploring Circuit Playground Express
3. Exploring Block Coding and Java Script
4. Physical Computing Projects
   a. Shake
   b. Heart Rate Monitor

Module 3 (1 credit) Raspberry Pi - Basic
1. Exploring Raspberry Pi
2. Setting up the Raspberry Pi and build a personal computer
3. Physical Computing Projects with Scratch

Module 4 (1 credit): Raspberry Pi - Advanced (RPi)
1. Explore interfaces CLI, TUI and GUI
2. Raspberry Pi Physical Computing Projects
   a. Hello World
   b. Blinking LED

Module 5 (1 credit): Programmable Logic Controllers (PLC)
1. Introduction to Velocio PLC
2. Physical Computing Projects with PLC
   a. Vbuilder software
   b. Programming with Ladder Logic
   c. Programming with Flow Chart

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**