

# MECHATRONICS (MECH)

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## **MECH 0001. The Science of Electronics**

*Units: 3*

Formerly known as CIE 1

Hours: 54 lecture

Survey of electronics technology presented in the context of the principles of science. Application of the scientific method to topics ranging from basic circuits to microprocessors, including electronic music, robotics, electric vehicles, fiber optics, semiconductors, and medical imaging. Scientific, historical, political, and economic connections to electronics technology. (CSU)

## **MECH 0004. Fundamentals of Mechatronics**

*Units: 4*

Formerly known as CIE 4

Hours: 108 (54 lecture, 54 laboratory)

Introduction to mechatronics, which combines electronics, mechanics, pneumatics, and hydraulics, under computer control; as applied to robotics and automation. Presented through hands-on, project-based experiments that demonstrate industrial applications. (CSU)

## **MECH 0008. Introduction to Electronics**

*Units: 3*

Formerly known as CIE 8

Hours: 54 lecture

General principles, concepts, terminology, and applications of electronics in the context of mechatronics technology. (CSU)

## **MECH 0010. Fundamentals of Electronics**

*Units: 4*

Formerly known as CIE 10

Advisory: Concurrent enrollment in MECH 14

Hours: 126 (54 lecture, 72 laboratory)

A fundamental study of electronic devices, circuits, and systems as applied to robotics, computers and industrial automation. Presented through hands-on, project-based experiments. (CSU)

## **MECH 0014. Fabrication Techniques**

*Units: 2*

Formerly known as CIE 14

Advisory: Concurrent enrollment in MECH 10

Hours: 72 (18 lecture, 54 laboratory)

Introductory course covering the function and construction of electronic projects and equipment. Includes design and fabrication of enclosures, single and double-sided printed circuit boards, safe use of power and hand tools, through-hole, point-to-point and surface-mount soldering, rework techniques, and wiring. Research component vendors and develop a spreadsheet-based Bill Of Materials. (CSU)

## **MECH 0025. Computers for Robotics and Automation**

*Units: 4*

Formerly known as CIE 25/CIS 25/CST 25

Hours: 108 (54 lecture, 54 laboratory)

Concentrated study of computer hardware and software as applied to industrial automation and robotics. Includes hardware and software installation, configuration, upgrading, diagnostics, troubleshooting, and repair. Topics include communication protocols, basic input/output system (BIOS), power-on self test (POST) procedures, disk operating system (DOS), Windows, Linux, and local area network (LAN) fundamentals. Industrial applications include data acquisition, and robotic control. (CSU)

## **MECH 0028. Independent Study**

*Units: 1-3*

Formerly known as CIE 28

Hours: 54 laboratory hours per unit

Designed for students interested in furthering their knowledge at an independent study level in an area where no specific curriculum offering is currently available. Independent study might include, but is not limited to, research papers, special subject area projects, and research projects. See Independent Study page in catalog. (CSU)

## **MECH 0044. Mechatronic Processes and Materials**

*Units: 2*

Formerly known as CIE 44

Hours: 72 (18 lecture, 54 laboratory)

Application of tools and materials required for design, installation and repair of mechatronic systems. Each student fabricates a final project applying system-based mechatronic principles and skills. (CSU)

## **MECH 0054. Mechatronics System**

*Units: 4*

Formerly known as CIE 54

Prerequisite: Completion of MECH 4 with grade of "C" or better

Hours: 108 (54 lecture, 54 laboratory)

Full integration of mechatronic principles into complete closed-loop systems such as automated production equipment and industrial robots. Topics include sensors, optical encoders, analog-to-digital and digital-to-analog conversion, closed-loop AC and DC motor control, hydraulic power concepts, hydraulic motors, pneumatic and hydraulic valves and actuators and fluid power computer simulation tools. (CSU)

## **MECH 0090. Microcontroller Embedded Systems**

*Units: 4*

Formerly known as CIE 90

Prerequisite: Completion of MECH 10 and MECH 14 with grades of "C" or better

Hours: 108 (54 lecture, 54 laboratory)

Study of microcontroller based embedded systems using industry standard hardware and development software. Topics and laboratory exercises covering system architecture, applications of embedded systems, real world interfacing, software development, test and troubleshooting techniques. (CSU)

## **MECH 0095. Internship in Mechatronics**

*Units: 0.5-4*

Formerly known as CIE 95

Designed for advanced students to work in an area related to their educational or occupational goal. Provides new on-the-job technical training under the direction of a worksite supervisor, allowing students to expand knowledge and skills in the chosen field. Mandatory orientation session and faculty approval to determine eligibility. One unit of credit is equal to each 60 hours of non-paid work, or each 75 hours of paid work. Students may earn up to a total of 16 units in internship courses (any course numbered 95 and PDEV 94). (CSU-with unit limitation)