

# Mechatronics

## **Degree Type**

Associate in Applied Science

## **Type**

Career

Division of STEAM

Associate Dean: Bradley Cole

A Mechatronics Technician is skilled in the art of troubleshooting a factory automation system with respect to:

- the motors that drive the system
- the mechanical components that comprise the system
- the sensors that provide information of the systems status and performance, and
- the communication network that connects this subsystem to the larger integrated system.

The purpose of this program is to prepare graduates to meet the needs of Advanced Manufacturing companies in both our local and regional area for employment as Process control Technicians, Industrial Maintenance positions, and general technical support positions. Worldwide, manufacturing has evolved to embrace automation through the application of robotics, computer-controlled machines, and supply chain management. This requires networked systems that can communicate with each other and may soon further evolve to what some have termed a digital control tower.

The “Web of Things” is expanding at an alarming rate. Companies can now use data analysis from smart sensors (“Things”) placed throughout their automated lines to predict future failures and thereby schedule maintenance to reduce downtimes in production.

The need for technicians that can maintain, upgrade, and troubleshoot these systems currently exceeds what educational institutions are producing. With the global growth of automation and a desire to remain competitive, the demand for graduates in this field should continue to rise.

Graduates should be able to:

- Troubleshoot a complex Mechatronics system through the measurement, interpretation, and analysis of electrical, PLC/microcontroller, mechanical, and network configuration values;
- Program mechatronic subsystem modules using current industry standard Programmable Logic Controllers (PLC's);
- Implement PLC networks, including configuration and data transfer using bus systems;
- Maintain, monitor, and repair computerized automation systems and robotic devices;
- Perform effectively as a team member communicating technically with upstream and downstream production operations in advanced manufacturing companies.

# Program Requirements

| Item #    | Title                                                        | Credits      |
|-----------|--------------------------------------------------------------|--------------|
| ENGL 1110 | College Communication                                        | 3.0          |
| ENGL 1020 | College Composition II                                       | 3.0          |
|           | MATH 1230 and 1240, or higher                                | 6            |
|           | Diversity, Equity, Inclusion, Social Justice (DEI/SJ) Course | 3            |
|           | Social Sciences or Humanities Elective                       | 3            |
| ELEC 1010 | Electricity                                                  | 0.0-4        |
| ELEC 1510 | Digital Electronics                                          | 0.0-4        |
| ELEC 1530 | Sensors and Actuators                                        | 0.0-4        |
| ELEC 2020 | Industrial Electronics                                       | 0.0-4        |
| ELEC 2040 | Electrical Machines and Motor Control                        | 0.0-4        |
| ELEC 2070 | Industrial Data Acquisition                                  | 0.0-4        |
| MECH 1050 | Engineering Graphics I                                       | 0.0-3        |
| MECH 2050 | Hydraulics and Pneumatics                                    | 0.0-3        |
| MECH 2110 | Mechanical Components                                        | 0.0-4        |
| TECH 1030 | Manufacturing Methods                                        | 3.0          |
| TECH 1080 | Manufacturing Methods Lab                                    | 1.0          |
| PHYS 1010 | Elementary Physics                                           | 0.0-4        |
|           | Technical Elective                                           | 3            |
|           | <b>Total Credits</b>                                         | <b>25-63</b> |

## Course Sequencing

## First Semester

Intended as a guide for academic planning. It need not be followed exactly or completed in four semesters.

| Item #    | Title                     | Credits |
|-----------|---------------------------|---------|
| ENGL 1110 | College Communication     | 3.0     |
|           | MATH 1230 or higher       | 3       |
| MECH 1050 | Engineering Graphics I    | 0.0-3   |
| ELEC 1010 | Electricity               | 0.0-4   |
| TECH 1030 | Manufacturing Methods     | 3.0     |
| TECH 1080 | Manufacturing Methods Lab | 1.0     |

## Second Semester

| Item #    | Title                  | Credits |
|-----------|------------------------|---------|
| ENGL 1020 | College Composition II | 3.0     |
|           | MATH 1240 or higher    | 3       |
| ELEC 1510 | Digital Electronics    | 0.0-4   |
| PHYS 1010 | Elementary Physics     | 0.0-4   |
| ELEC 1530 | Sensors and Actuators  | 0.0-4   |

## Third Semester

| Item #    | Title                                                        | Credits |
|-----------|--------------------------------------------------------------|---------|
| ELEC 2040 | Electrical Machines and Motor Control                        | 0.0-4   |
| MECH 2050 | Hydraulics and Pneumatics                                    | 0.0-3   |
| MECH 2110 | Mechanical Components                                        | 0.0-4   |
|           | Diversity, Equity, Inclusion, Social Justice (DEI/SJ) Course | 3       |

## Fourth Semester

| Item #    | Title                                  | Credits |
|-----------|----------------------------------------|---------|
| ELEC 2020 | Industrial Electronics                 | 0.0-4   |
| ELEC 2070 | Industrial Data Acquisition            | 0.0-4   |
|           | Social Sciences or Humanities Elective | 3       |
|           | Technical Elective                     | 3       |

## Footnotes

\*Based on placement, students might be required to take developmental and/or prerequisite classes before taking the required English and Math courses.

Technical Elective: Choose from CSNT1200, ELEC 1500, ELEC 2030, ELEC 2050, GLSS 2010, MECH 1060, MECH 1560, MECH 1570, MECH 2210, MFGT 2030, TECH 1060, or TECH 1120.

\*Diversity, Equity, Inclusion, Social Justice (DEI/SJ) Course: See General Education Requirements for courses that meet this requirement.

\*ENGL 1110: Students may take ENGL 1010 and SPCH 1080 in place of ENGL 1110.