

Mechatronics Engineering Technology

Mechatronics Engineering Technology Suggested Course Sequence

The following is the suggested plan for when to take each course to complete the Associate in Applied Science degree, based on the program requirements of the 2023-2024 catalog. This is only a recommendation — you may take courses in another order upon consultation with your advisor. This plan is based on you starting with college-level math and English courses, starting your program in the fall, and attending full-time. You can also follow this sequence if you attend part-time. Speak with your academic advisor about the plan and any questions. This program might also offer diplomas or certificates; visit the catalog or contact the program for details. Visit the Academic Advising page for instructions on locating your assigned advisor: <https://www.cpcc.edu/academics/academic-advising>

| Term I | | Credits |
|--|--|-----------|
| ENG 111 | Writing and Inquiry | 3.0 |
| MAT 121 | Algebra/Trigonometry I | 3.0 |
| ELC 131 | Circuit Analysis I | 4.0 |
| ISC 112 | Industrial Safety | 2.0 |
| EGR 125 | Appl Software for Tech | 2.0 |
| ACA 122 | College Transfer Success | 1.0 |
| Credits | | 15 |
| Term II | | Credits |
| PHY 131 | Physics-Mechanics | 4.0 |
| ATR 112 | Introduction to Automation | 3.0 |
| ELC 135 | Electrical Machines | 3.0 |
| ISC 212 | Metrology | 2.0 |
| DFT 154 | Intro to Solid Modeling | 3.0 |
| You may have completed program certificate C40350-C5. Confirm eligibility with your academic advisor. | | |
| Credits | | 15 |
| Term III | | Credits |
| ELC 213 | Instrumentation | 4.0 |
| Humanities/Fine Arts | | 3.0 |
| COM 110 | Introduction to Communication | 3.0 |
| Credits | | 10 |
| Term IV | | Credits |
| ELN 260 | Prog Logic Controllers | 4.0 |
| MEC 265 | Fluid Mechanics | 3.0 |
| MEC 130 | Mechanisms | 3.0 |
| ELC 136 | Electrical Machines II | 4.0 |
| Credits | | 14 |
| Term V | | Credits |
| PCI 173 or PCI 170 | Programmable Systems or DAQ and Control | 4.0 |
| MEC 210 | Applied Mechanics | 3.0 |
| MEC 180 | Engineering Materials | 3.0 |
| MEC 161 | Manufacturing Processes I | 3.0 |
| ECO 251 | Principles of Microeconomics | 3.0 |
| You may have completed program certificate C40350-C8. Confirm eligibility with your academic advisor. | | |
| Credits | | 16 |
| Total Credits | | 70 |

MEC 110. Introduction to CAD/CAM. 2.0 Credits. Class-1.0. Clinical-0.0. Lab-2.0. Work-0.0

This course introduces CAD/CAM. Emphasis is placed on transferring part geometry from CAD to CAM for the development of a CNC-ready program. Upon completion, students should be able to use CAD/CAM software to produce a CNC program.

Prerequisites: Take DFT 154

MEC 111. Machine Processes I. 3.0 Credits. Class-1.0. Clinical-0.0. Lab-4.0. Work-0.0

This course introduces shop safety, hand tools, machine processes, measuring instruments, and the operation of machine shop equipment. Topics include use and care of tools, safety, measuring tools, and the basic setup and operation of common machine tools. Upon completion, students should be able to manufacture simple parts to specified tolerance.

MEC 130. Mechanisms. 3.0 Credits. Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course introduces the purpose and action of various mechanical devices. Topics include cams, cables, gear trains, differentials, screws, belts, pulleys, shafts, levers, lubricants, and other devices. Upon completion, students should be able to analyze, maintain, and troubleshoot the components of mechanical systems.

MEC 155. Environmentally Benign Manufacturing. 3.0 Credits.

Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course introduces environmental issues involving the generation and management of hazardous materials and wastes in manufacturing operations. Topics include the analysis of manufacturing trends, pollution minimization strategies, and the advantages of incorporating a sustainable approach to manufacturing. Upon completion, students should be able to discuss analysis and modification of industrial processes in manufacturing facilities toward a sustainable end.

MEC 161. Manufacturing Processes I. 3.0 Credits. Class-3.0.

Clinical-0.0. Lab-0.0. Work-0.0

This course provides the fundamental principles of value-added processing of materials into usable forms for the customer. Topics include material properties and traditional and non-traditional manufacturing processes. Upon completion, students should be able to specify appropriate manufacturing processing for common engineering materials.

MEC 172. Introduction to Metallurgy. 3.0 Credits. Class-2.0.

Clinical-0.0. Lab-2.0. Work-0.0

This course covers the production, properties, testing, classification, microstructure, and heat-treating effects of ferrous and non-ferrous metals. Topics include the iron-carbon phase diagram, ITT diagram, ANSI code, quenching, senescing, and other processes concerning metallurgical transformations. Upon completion, students should be able to understand the iron-carbon phase diagram, ITT diagram, microstructure images, and other phenomena concerning the behavior of metals.

MEC 180. Engineering Materials. 3.0 Credits. Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the physical and mechanical properties of materials. Topics include materials testing, pre- and post-manufacturing processes, and material selection of ferrous and non-ferrous metals, plastics, composites, and non-conventional materials. Upon completion, students should be able to utilize basic material property tests and select appropriate materials for applications. This course covers the physical and mechanical properties of materials. Topics include testing, heat treating, ferrous and non-ferrous metals, plastics, composites, and material selection. Upon completion, students should be able to specify basic tests and properties and select appropriate materials on the basis of specific properties.

Prerequisites: Take ENG 111 ENG 112 or ENG 113

MEC 210. Applied Mechanics. 3.0 Credits. Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course is a study of forces, stresses, and strains acting upon mechanical components. Topics include static equilibrium; normal, shear, and bending stresses; mathematical and graphical solution techniques; and the relationship between stress and strain. Upon completion, students should be able to demonstrate proficiency in analyzing the forces, stresses, and strains common to applications in the workplace.

Prerequisites: Take PHY 131 PHY 151 or PHY 251

MEC 260. Fundamentals of Machine Design. 3.0 Credits. Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the fundamental principles of machine design. Topics include simple analysis of forces, moments, stresses, strains, friction, kinematics, and other considerations for designing machine elements. Upon completion, students should be able to analyze machine components and make component selections from manufacturers' catalogs.

Prerequisites: Take MEC 180; Take DFT 154 or DFT 170

MEC 265. Fluid Mechanics. 3.0 Credits. Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course covers the physical behavior of fluids and fluid systems. Topics include fluid statics and dynamics, laminar and turbulent flow, Bernoulli's Equation, components, applications, and other related topics. Upon completion, students should be able to apply fluid power principles to practical applications.

Prerequisites: Take PHY 131 PHY 151 or PHY 251

MEC 267. Thermal Systems. 3.0 Credits. Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course introduces the fundamental laws of thermodynamics. Topics include work and energy, open and closed systems, and heat engines. Upon completion, students should be able to demonstrate a knowledge of the laws and principles that apply to thermal power.

Prerequisites: Take One: PHY 131 or PHY 151

MEC 270. Machine Design. 4.0 Credits. Class-3.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers the basic principles underlying design and selection of machine elements. Topics include stress analysis, selection of components, power transmission, and other design considerations. Upon completion, students should be able to identify and solve mechanical design problems by applying basic engineering principles.

Prerequisites: Take One Set: Set 1: EGR 250; Set 2: EGR 251 and EGR 252

MEC 275. Engineering Mechanisms. 3.0 Credits. Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course covers plane motion and devices used to generate plane motion. Topics include analysis of displacement, velocity, acceleration, gears, cams, and other mechanical systems. Upon completion, students should be able to graphically and mathematically analyze a plane motion system.

Prerequisites: Take MAT 122 or MAT 172