

Mechatronics 3 (8556)

Applying 4.0 Basic Safety Standards for Mechatronics M3.1

- 1 Comply with federal, state, and local safety requirements. M3.1.1
- 2 Demonstrate lockout-tagout procedures. M3.1.2
- 3 Maintain a safe working environment. M3.1.3
- 4 Explain safe working practices around electrical hazards. M3.1.4
- 5 Identify emergency first-aid procedures. M3.1.5
- 6 Identify the types of fires and the methods used to extinguish them. M3.1.6
- 7 (Optional) Demonstrate the use of a fire extinguisher. M3.1.7
- 8 Identify personal protective equipment (PPE) requirements. M3.1.8
- 9 Inspect hand and power tools to ensure safety and usability. M3.1.9
- 10 Demonstrate lifting and carrying techniques. M3.1.10
- 11 Report injuries. M3.1.11
- 12 Report personal, environmental, and equipment safety violations to the appropriate authority. M3.1.12
- 13 Pass the safety exam. M3.1.13

Exploring Programming Applications M3.2

- 1 Create sequential programs using flowcharts. M3.2.1
- 2 Describe the use of logic in programming machines used in industry. M3.2.2
- 3 Convert units in numeric systems. M3.2.3

Understanding Programmable Logic Controller Systems M3.3

- 1 Explain the role of programmable logic controllers (PLCs) (or programmable automation controllers [PACs]) within mechatronic systems, modules, and subsystems. M3.3.1
- 2 Trace the flow of information in a control function for a mechatronic system or subsystem. M3.3.2
- 3 Define the term Industry 4.0 Industrial Internet of Things (IIoT). M3.3.3

-
- 4 Describe the basic functions and design of PLCs.** M3.3.4

 - 5 Describe numbering systems and data types used in computer programming.** M3.3.5

 - 6 Describe DeMorgan's theorem.** M3.3.6

 - 7 Apply DeMorgan's theorem in creating logic circuits.** M3.3.7

 - 8 Simplify logical equations.** M3.3.8

 - 9 Create Boolean logic equations to prescribe the use of logic gates in the implementation of a given scenario.** M3.3.9

 - 10 Explain hexadecimal, decimal, octal, binary, 2s complement, and binary coded decimal (BCD) values as used in a common PLC.** M3.3.10

 - 11 Explain ladder logic and function block diagram (FBD) programming.** M3.3.11

 - 12 Convert wiring and line or ladder diagrams for simple logic tasks into PLC programs.** M3.3.12

 - 13 Connect a PLC with electrical components.** M3.3.13

 - 14 Create PLC programs.** M3.3.14

 - 15 Execute PLC programs on a PLC.** M3.3.15

Troubleshooting Fluid-Power Systems M3.4

- 1 Assess pneumatic and/or hydraulic components within a mechatronic system.** M3.4.1

- 2 Perform adjustments on pneumatic and/or hydraulic components within a mechatronic system.** M3.4.2

- 3 Document adjustments in an equipment log.** M3.4.3

- 4 Troubleshoot malfunctioning pneumatic and/or hydraulic systems.** M3.4.4

- 5 Document the cause and repair of the malfunction.** M3.4.5

Preparing for Industry Certification M3.5

- 1 Describe the process and requirements for obtaining industry certifications related to the mechatronics course.** M3.5.1

- 2 Identify testing skills and strategies for certification examination.** M3.5.2

- 3 Demonstrate ability to successfully complete selected practice examinations (e.g., practice questions similar to those on certification examinations).** M3.5.3

4 Complete an industry certification examination representative of skills learned in this course. M3.5.4