Virginia CTE

Mechatronics 2 (8555)

Applying Basic Safety Standards for Mechanics M2.1

1. Comply with federal, state, and local safety requirements. M2.1.1
2. Demonstrate lockout-tagout procedures. M2.1.2
3. Maintain a safe working environment. M2.1.3
4. Explain safe working practices around electrical hazards. M2.1.4
5. Identify emergency first-aid procedures. M2.1.5
6. Identify the types of fires and the methods used to extinguish them. M2.1.6
7. (Optional) Demonstrate the use of a fire extinguisher. M2.1.7
8. Identify personal protective equipment (PPE) requirements. M2.1.8
9. Inspect hand and power tools to ensure safety and usability. M2.1.9
10. Demonstrate lifting and carrying techniques. M2.1.10
11. Report injuries. M2.1.11
12. Report personal, environmental, and equipment safety violations to the appropriate authority. M2.1.12
13. Pass the safety exam. M2.1.13

Understanding Electrical Components in a Mechatronic System M2.2

1. Trace the flow of electrical and mechanical energy in a mechatronic system. M2.2.1
2. Explain the specific roles of electrical components within a typical circuit schematic. M2.2.2
3. Compute wire and fuse sizes based on the load required by the motor. M2.2.3
4. Analyze basic direct current (DC) circuits to predict and verify circuit behavior. M2.2.4
5. Analyze circuits to predict and verify the behavior of series circuits vs. parallel DC circuits or resistances. M2.2.5

	6 Explain the physical operation of electromagnetic components in a mechatronic system. M2.2.6
	7 Evaluate circuits to predict and verify the behavior of the electrical and physical properties of components. M2.2.7
Understanding Mechanical Components in a Mechanical System M2.3	1 Explain the role of various mechanical components within a given system or module. M2.3.1
	2 Describe the basic physical properties of mechanical components. M2.3.2
	3 Identify mechanical components of systems prescribed by drawings. M2.3.3
	4 Calculate gear ratios and horsepower. M2.3.4
	5 Distinguish between various AC motors and DC motors. M2.3.5
	6 Describe power transmission components. M2.3.6
	7 Maintain a mechatronic system. M2.3.7
	8 Assemble the mechanical components in a mechatronic system. M2.3.8
Understanding Fluid Power (Hydraulics and Pneumatics) M2.4	1 Demonstrate fluid-power system safety. M2.4.1
	2 Explain the principles of fluid power. M2.4.2
	3 Differentiate between hydraulic and pneumatic fluid power. M2.4.3
	4 Identify fluid power components. M2.4.4
	5 Read fluid power circuit diagrams. M2.4.5
	6 Explain fluid-power systems. M2.4.6
	7 Identify types of fluid power pumps or compressors. M2.4.7
	8 Identify types of fluid power actuators. M2.4.8
	9 Examine the physical characteristics and compressibility of gases. M2.4.9
	10 Describe the flow of energy in a fluid system. M2.4.10
	11 Construct fluid-power systems from components and symbols. M2.4.11
	12 (Optional) Explain fluid-power system maintenance. M2.4.12
Exploring Computer Applications M2.5	1 Demonstrate a working knowledge of the personal computer (PC). M2.5.1

	2	**Discuss software and hardware.** M2.5.2
	3	**Explain the function of the Internet and manufacturing networks.** M2.5.3
Exploring Digital Circuit Fundamentals M2.6	1	**Describe logic gates.** M2.6.1
	2	**Examine simple logic circuits using a variety of logic gates.** M2.6.2
Using Technical Documents M2.7	1	**Consult technical documents to assess a mechatronic system and troubleshoot malfunctions in electrical components.** M2.7.1
	2	**Verify the parts, relationships, and behavior depicted by the technical data sheets for components within a mechatronic system.** M2.7.2
	3	**Create a document describing the operation of a mechatronic system.** M2.7.3