Virginia CTE

Technology of Robotic Design (2024)

Demonstrating Personal Qualities and Abilities	1	Demonstrate creativity and innovation. 1
	2	Demonstrate critical thinking and problem solving. 2
	3	Demonstrate initiative and self-direction. 3
	4	Demonstrate integrity. 4
	5	Demonstrate work ethic. 5
Demonstrating Interpersonal Skills	6	Demonstrate conflict-resolution skills. 6
	7	Demonstrate listening and speaking skills. 7
	8	Demonstrate respect for diversity. 8
	9	Demonstrate customer service skills. 9
	10	Collaborate with team members. 10
Demonstrating Professional Competencies	11	Demonstrate big-picture thinking. 11
	12	Demonstrate career- and life-management skills. 12
	13	Demonstrate continuous learning and adaptability. 13
	14	Manage time and resources. 14
	15	Demonstrate information-literacy skills. 15
	16	Demonstrate an understanding of information security. 16
	17	Maintain working knowledge of current information-technology (IT) systems. 17
	18	Demonstrate proficiency with technologies, tools, and machines common to a specific occupation. 18
		Apply mathematical skills to job-specific tasks. 19

Skip to main content

	20 Demonstrate professionalism. 20
	21 Demonstrate reading and writing skills. 21
	22 Demonstrate workplace safety. 22
Examining All Aspects of an Industry	23 Examine aspects of planning within an industry/organization. 23
	24 Examine aspects of management within an industry/organization. 24
	25 Examine aspects of financial responsibility within an industry/organization. 25
	26 Examine technical and production skills required of workers within an industry/organization. 26
	27 Examine principles of technology that underlie an industry/organization. 27
	28 Examine labor issues related to an industry/organization. 28
	29 Examine community issues related to an industry/organization. 29
	30 Examine health, safety, and environmental issues related to an industry/organization. 30
Addressing Elements of Student Life	31 Identify the purposes and goals of the student organization. 31
	32 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult. 32
	33 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects. 33
	34 Identify Internet safety issues and procedures for complying with acceptable use standards. 34
Exploring Work-Based Learning	35 Identify the types of work-based learning (WBL) opportunities. 35
	36 Reflect on lessons learned during the WBL experience. 36
	37 Explore career opportunities related to the WBL experience. 37
	38 Participate in a WBL experience, when appropriate. 38
Exploring Control Systems and Robotic Systems	39 Define robotics, automation, and control systems. 39
	40 Investigate careers in robotics. 40
	Research the development and future of robotics. 41

Skip to main content

	42 Explain the universal systems model. 42
	43 Identify open and closed loops in control systems. 43
	44 Demonstrate precision measurement equipment and techniques. 44
	45 Describe components or processes that typically require precision measurement. 45
	46 Apply direct and indirect measurement systems and coordinate systems. 46
	47 Simulate control and automation systems. 47
Exploring Electrical Concepts	48 Describe the difference between alternating current (AC) and direct current (DC). 48
	49 Describe the concepts of voltage, current, and resistance in electricity. 49
	50 Identify safety precautions and information for electricity (AC and DC). 50
	51 Explain the primary functions of electronic systems components. 51
	52 Identify sensors. 52
	53 Simulate electronic circuits. 53
	54 Demonstrate soldering technique. 54
	55 Create circuits. 55
	56 Measure circuit values with a multimeter. 56
	57 Design a circuit for a given purpose. 57
Exploring Mechanical and Fluid Concepts	58 Identify the primary concepts and components of mechanical systems. 58
	59 Explain primary concepts and components of a fluid power system. 59
	60 Design a mechanical system. 60
	61 Demonstrate a mechanical system. 61
Exploring the Components of Robotic Systems	62 Identify components of robotic systems. 62
	63 Demonstrate how sensors are used to control robotic technology. 63
	64 Research robotic hardware used in various industries. 64
	Compare open and proprietary hardware components. 65

Skip to main content

Explaining Control Systems	66 Compare analog electronics and digital electronics for control systems. 66
	67 Describe the operation of basic logic circuits. 67
	68 Identify the primary types of data transmission hardware. 68
Exploring Microprocessor/Microcontroller System Basics	69 Describe the function of an operating system. 69
	70 Describe the essential components of a computing system. 70
	71 Describe software applications within robotic systems. 71
	72 Describe how computers are used to control automated systems. 72
	73 Describe robotic systems interfaces. 73
	74 Describe the purpose of a microcontroller/logic controller. 74
Programming Control Systems	75 Design code for a given purpose. 75
	76 Implement basic programming procedures. 76
	77 Select the most appropriate programming language or platform for an application. 77
	78 Describe the fundamentals of CNC. 78
	79 Program a robotic system. 79
	80 Ensure the security of programs. 80
Creating a Robotic System	81 Design a robot. 81
	82 Use additive manufacturing. 82
	83 Build a robot. 83
	84 Reengineer the design of an existing robotic system. 84