Virginia CTE

Engineering Analysis and Applications II (2023)

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
	19	Apply mathematical skills to job-specific tasks. 19

	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
Applying Safety in Engineering Activities	39 Demonstrate knowledge of appropriate personal safety procedures. 39
	40 Comply with safety rules in laboratory activities. 40
	41 Demonstrate lab safety. 41

	42 Describe hazards associated with machines and tools. 42
Exploring Engineering Systems as Applied to Areas of the Designed World	**43** Analyze differences between the various areas of the designed world. 43
	44 Describe major engineering disciplines. 44
	45 Analyze the interdisciplinary nature of engineering projects. 45
	46 Integrate the parts of a project. 46
	47 Analyze the impact of an engineering design solution on industry, economy, society, and environment. 47
Applying the Engineering Design Process	**48** Identify the need for an engineered product or system. 48
	49 Explain the validity of designing alternative solutions to an engineering design problem. 49
	50 Design an engineering solution to a real-world problem. 50
	51 Implement a design. 51
	52 Iterate on the solution. 52
	53 Maintain documentation of project. 53
	54 Present a solution. 54
Using Logic and Problem-Solving Techniques	**55** Reverse-engineer a product, process, or idea. 55
	56 Define algorithm. 56
	57 Create an algorithm to solve an engineering problem. 57
	58 Program a microcontroller. 58
	59 Explain the benefits of modeling and simulation. 59
	60 Create a model or simulation for an engineering product, process, or idea. 60
Examining Engineering Materials and Manufacturing	**61** List common engineering materials and common applications of each. 61
	62 Describe properties of engineering materials in terms of their internal structures. 62
	63 Identify the correct engineering material for a specific function. 63
	64 List common causes of material failure. 64

	65 **Demonstrate processes used with metal, wood, polymer, ceramic, and composite materials, including adhesives.** 65
	66 **Identify common hand tools and fasteners.** 66
Examining Engineering Systems	67 **Explore electrical systems.** 67
	68 **Explain primary concepts and components of a fluid power system.** 68
	69 **Identify the primary concepts and components of thermodynamic systems.** 69
	70 **Identify the primary concepts and components of mechanical systems.** 70
	71 **Demonstrate control of systems.** 71
	72 **Design a system that transforms energy from one type to another.** 72
Applying Engineering Knowledge	73 **Identify an engineering need for a local issue.** 73
	74 **Develop a solution for an engineering problem.** 74