

# Engineering Analysis and Applications II (2023)

## Demonstrating Personal Qualities and Abilities

**1 Demonstrate creativity and innovation. 1**

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**2 Demonstrate critical thinking and problem solving. 2**

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**3 Demonstrate initiative and self-direction. 3**

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**4 Demonstrate integrity. 4**

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**5 Demonstrate work ethic. 5**

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## Demonstrating Interpersonal Skills

**6 Demonstrate conflict-resolution skills. 6**

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**7 Demonstrate listening and speaking skills. 7**

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**8 Demonstrate respect for diversity. 8**

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**9 Demonstrate customer service skills. 9**

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**10 Collaborate with team members. 10**

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## Demonstrating Professional Competencies

**11 Demonstrate big-picture thinking. 11**

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**12 Demonstrate career- and life-management skills. 12**

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**13 Demonstrate continuous learning and adaptability. 13**

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**14 Manage time and resources. 14**

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**15 Demonstrate information-literacy skills. 15**

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**16 Demonstrate an understanding of information security. 16**

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**17 Maintain working knowledge of current information-technology (IT) systems. 17**

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**18 Demonstrate proficiency with technologies, tools, and machines common to a specific occupation. 18**

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**19 Apply mathematical skills to job-specific tasks. 19**

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**20 Demonstrate professionalism.** 20

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**21 Demonstrate reading and writing skills.** 21

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**22 Demonstrate workplace safety.** 22

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### **Examining All Aspects of an Industry**

**23 Examine aspects of planning within an industry/organization.** 23

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**24 Examine aspects of management within an industry/organization.** 24

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**25 Examine aspects of financial responsibility within an industry/organization.** 25

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**26 Examine technical and production skills required of workers within an industry/organization.** 26

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**27 Examine principles of technology that underlie an industry/organization.** 27

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**28 Examine labor issues related to an industry/organization.** 28

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**29 Examine community issues related to an industry/organization.** 29

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**30 Examine health, safety, and environmental issues related to an industry/organization.** 30

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### **Addressing Elements of Student Life**

**31 Identify the purposes and goals of the student organization.** 31

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**32 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.** 32

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**33 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.** 33

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**34 Identify Internet safety issues and procedures for complying with acceptable use standards.** 34

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### **Exploring Work-Based Learning**

**35 Identify the types of work-based learning (WBL) opportunities.** 35

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**36 Reflect on lessons learned during the WBL experience.** 36

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**37 Explore career opportunities related to the WBL experience.** 37

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**38 Participate in a WBL experience, when appropriate.** 38

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### **Applying Safety in Engineering Activities**

**39 Demonstrate knowledge of appropriate personal safety procedures.** 39

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**40 Comply with safety rules in laboratory activities.** 40

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**41 Demonstrate lab safety.** 41

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

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**65 Demonstrate processes used with metal, wood, polymer, ceramic, and composite materials, including adhesives. 65**

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**66 Identify common hand tools and fasteners. 66**

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**Examining Engineering Systems**

**67 Explore electrical systems. 67**

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**68 Explain primary concepts and components of a fluid power system. 68**

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**69 Identify the primary concepts and components of thermodynamic systems. 69**

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**70 Identify the primary concepts and components of mechanical systems. 70**

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**71 Demonstrate control of systems. 71**

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**72 Design a system that transforms energy from one type to another. 72**

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**Applying Engineering Knowledge**

**73 Identify an engineering need for a local issue. 73**

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**74 Develop a solution for an engineering problem. 74**