

Engineering Studies (8491) 36 weeks

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A Demonstrating Personal Qualities and Abilities ES.1

- 1 Demonstrate creativity and innovation. ES.1.1
 - 2 Demonstrate critical thinking and problem solving. ES.1.2
 - 3 Demonstrate initiative and self-direction. ES.1.3
 - 4 Demonstrate integrity. ES.1.4
 - 5 Demonstrate work ethic. ES.1.5
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B Demonstrating Interpersonal Skills ES.2

- 6 Demonstrate conflict-resolution skills. ES.2.6
 - 7 Demonstrate listening and speaking skills. ES.2.7
 - 8 Demonstrate respect for diversity. ES.2.8
 - 9 Demonstrate customer service skills. ES.2.9
 - 10 Collaborate with team members. ES.2.10
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C Demonstrating Professional Competencies ES.3

- 11 Demonstrate big-picture thinking. ES.3.11
- 12 Demonstrate career- and life-management skills. ES.3.12
- 13 Demonstrate continuous learning and adaptability. ES.3.13
- 14 Manage time and resources. ES.3.14
- 15 Demonstrate information-literacy skills. ES.3.15
- 16 Demonstrate an understanding of information security. ES.3.16
- 17 Maintain working knowledge of current information-technology (IT) systems. ES.3.17
- 18 Demonstrate proficiency with technologies, tools, and machines common to a specific occupation. ES.3.18
- 19 Apply mathematical skills to job-specific tasks. ES.3.19
- 20 Demonstrate professionalism. ES.3.20
- 21 Demonstrate reading and writing skills. ES.3.21
- 22 Demonstrate workplace safety. ES.3.22

D Examining All Aspects of an Industry ES.4

- 23 Examine aspects of planning within an industry/organization. ES.4.23
- 24 Examine aspects of management within an industry/organization. ES.4.24
- 25 Examine aspects of financial responsibility within an industry/organization. ES.4.25
- 26 Examine technical and production skills required of workers within an industry/organization. ES.4.26
- 27 Examine principles of technology that underlie an industry/organization. ES.4.27
- 28 Examine labor issues related to an industry/organization. ES.4.28
- 29 Examine community issues related to an industry/organization. ES.4.29
- 30 Examine health, safety, and environmental issues related to an industry/organization. ES.4.30

E Addressing Elements of Student Life ES.5

- 31 Identify the purposes and goals of the student organization. ES.5.31
- 32 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult. ES.5.32
- 33 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects. ES.5.33
- 34 Identify Internet safety issues and procedures for complying with acceptable use standards. ES.5.34

F Exploring Work-Based Learning ES.6

- 35 Identify the types of work-based learning (WBL) opportunities. ES.6.35
- 36 Reflect on lessons learned during the WBL experience. ES.6.36
- 37 Explore career opportunities related to the WBL experience. ES.6.37
- 38 Participate in a WBL experience, when appropriate. ES.6.38

G Applying Safety in Engineering Studies ES.7

- 39 Demonstrate knowledge of appropriate personal safety procedures. ES.7.39
- 40 Comply with safety rules in laboratory activities. ES.7.40
- 41 Define risk and safety. ES.7.41

H Examining the Engineering Profession ES.8

- 42 Describe how engineering and technology have significantly influenced contemporary society and the environment. ES.8.42
- 43 Research an application of emerging technologies that may have significant influence on contemporary society and the environment. ES.8.43
- 44 Explain how ethical behavior of engineers is essential to the betterment of society. ES.8.44
- 45 Examine how intellectual property is treated in the engineering world. ES.8.45

I Practicing Engineering Fundamentals ES.9

- 46 Perform a case study analysis. ES.9.46
- 47 Communicate engineering ideas using computer applications. ES.9.47
- 48 Demonstrate research techniques and strategies used by engineers. ES.9.48
- 49 Evaluate the safety of designs. ES.9.49
- 50 Reverse-engineer a product, process, or idea. ES.9.50
- 51 Create an algorithm to solve an engineering problem. ES.9.51
- 52 Demonstrate teamwork skills necessary for success when working in a technological team. ES.9.52

J Exploring Mathematics and Science Concepts in Engineering Applications ES.10

- 53 Identify physics concepts that are key to designing mechanical systems. ES.10.53
- 54 Explore physics and mathematical concepts that are key to designing electrical and computer systems. ES.10.54
- 55 Identify the chemistry concepts that are key to thermodynamic systems. ES.10.55
- 56 Identify biology and chemistry concepts that are key to engineered biological and/or environmental systems. ES.10.56

K Applying the Engineering Design Process ES.11

- 57 Identify the need for a product or system. ES.11.57
- 58 Explain the validity of designing alternative solutions to an engineering design problem or challenge. ES.11.58
- 59 Identify the specifications of the design problem. ES.11.59
- 60 Generate multiple solutions to the design problem. ES.11.60
- 61 Justify an optimal solution to the design problem. ES.11.61
- 62 Create a model or prototype for the chosen solution. ES.11.62
- 63 Create a test plan based on specifications. ES.11.63
- 64 Test the solution to the design problem. ES.11.64
- 65 Evaluate the test results. ES.11.65
- 66 Modify the solution to the design problem, if needed. ES.11.66
- 67 Test the modification/alternative solution, if needed. ES.11.67
- 68 Maintain documentation. ES.11.68
- 69 Present a solution. ES.11.69

L Communicating Fundamental Information ES.12

- 70 Communicate with stakeholders to inform requirements. ES.12.70
- 71 Present an oral technical report on an engineering project. ES.12.71
- 72 Write a business letter to request information or materials. ES.12.72
- 73 Identify the different types of models available to engineers. ES.12.73
- 74 Explain the benefits and limitations of modeling and simulation. ES.12.74
- 75 Use rapid prototyping to develop models. ES.12.75
- 76 Create a model or simulation for an engineering product, process, or idea. ES.12.76

M Exploring Career Opportunities in Engineering ES.13

- 77 Explore career opportunities for engineering graduates, both within and outside the field of engineering. ES.13.77
- 78 Examine the breadth of topics within an engineering plan of study. ES.13.78
- 79 Participate in a mock interview. ES.13.79