## *Principles of Engineering*

| | Measurable Learner Objectives (MLOs) | Show-Me Content | Show-Me Goals | National Standards |
|---|---|---|---|---|
| **A.** | Identify major historical events that have impacted the evolution of principles of engineering. | CA3, CA6, SS2, SS6, SC8 | 1.9, 3.1 | 7:9-12 (All), 10:6-8G, 11:9-12M |
| **B.** | Demonstrate knowledge of principles of engineering concepts, terms, and definitions. | CA1, CA3, SC1, SC2, SS2 | 1.9, 3.4 | 8:9-12H, 9:9-12 (All), 13:9-12K, 13:9-12N |
| **C.** | Understand the various roles and influences that teamwork has upon the engineering process (e.g., responsibilities, out-sourcing, communication, ethics, social, environmental, and financial constraints). | CA1, CA4, CA7, SS4, SS6, | 1.2, 2.3, 3.8, 4.4, 4.6, 4.8 | 4:9-12J, 2:9-12W-AA |
| **D.** | Explore career opportunities, job functions, professional responsibilities, and educational requirements within the field of engineering. | CA1, CA4, CA6 | 2.1, 4.8 | 17:9-12Q |
| **E.** | Create sketches to communicate solutions for design and engineering problems. | CA5, FA1, FA2 | 2.1, 2.5 | 9:9-12I, 17:9-12Q |
| **F.** | Demonstrate appropriate presentation skills for principles of engineering topics (e.g., voice techniques, written reports, visual aids, preparation, audience recognition, and multimedia applications). | CA1, CA4, CA6, MA3, SC8 | 1.8, 2.1, 2.5 | 5:9-12L, 11:9-12R, 12:9 12L, 19:6-8F |
| **G.** | Apply mathematical formulas and computer aided graphical software programs to the design modeling process. | MA2, MA3, SC2 | 1.6, 1.8 | 11:9-12P |
| **H.** | Demonstrate engineering skills to solve engineering system design problems (e.g., mathematical calculations, precision measurement, accuracy of plans, engineer's report, and programming). | MA1, MA2, MA3, MA4, SC1, SC2 | 3.1, 3.7 | 2:9-12Y, 11:9-12O, 11:9-12P, 11:9-12Q |
| **I.** | Identify and explain the essential components and functions of an engineering system (e.g., mechanisms, thermodynamics, fluid systems, electrical systems, and control systems). | CA1, CA6, FA1, MA1, MA2, SC1, SC2 | 1.2, 1.10, 1.8, 2.1, 3.1, 3.3, 3.5, 4.7 | 2:6-8M, 2:9-12X, 5:9-12G, 11:9-12Q, 12:9-12L, 12:9-12N, 12:9-12O 16: 9-12N |
| **J.** | Categorize and select problem solutions in verbal and written format. | CA6, MA1, MA4, SC8 | 1.2, 2.1 | 11:9-12R, 13:9-12L, 13:9-12K |
| **K.** | Develop a materials analysis for a given product (e.g., material properties, finished design, machine capabilities, safety, environmental concerns, and cost). | CA6, H/PE6, SC7 | 1.3, 1.8, 3.8 | 9:9-12L, 19:9-12M |
| **L.** | Analyze the behavior of a solid body resulting from stresses, strains, and displacement on a structure. | MA2, SC1, SC2 | | 11:9-12P |
| **M.** | Demonstrate assembly modeling skills to solve design problems (e.g., structure, vectoring, deflection, and area). | | 2.5 | 11:9-12O |
| **N.** | Describe material categories, strength of materials, physical properties, and material testing. | CA1, CA4, SC1, SC2, SC7 | 1.3, 1.8, 2.1, 3.5 | 19:9-12M |
| **O.** | Describe quality control and its influence on production and manufacturing processes. | CA1, MA3, SS3, SS4 | 1.6, 1.8, 4.4 | 2:9-12DD, 12:9-12L, 19:6-8F, 19:6-8H |
| **P.** | Analyze engineering failures and their legal, social, and ethical impact on society and the environment. | CA1, CA4, CA6, SC1, SC8 | 1.2, 1.8, 2.1, 3.1, 3.8, 4.4 | 4:9-12J, 5:9-12L, 12:9-12L, 12:9-12M |
| **Q.** | Demonstrate a mastery of kinematics concepts in the field of engineering (e.g., distance, displacement, velocity, and linear and trajectory motion). | MA4, SC2 | 1.3, 1.8, 3.7 | 11:9-12Q, 12:9-12L, 12:9-12N |