

## ***Introduction to Engineering Design***

	<b>Measurable Learner Objectives (MLOs)</b>	<b>Show-Me Content</b>	<b>Show-Me Goals</b>	<b>National Standards</b>
<b>A.</b>	Identify major historical achievements and artistic influences that have impacted the engineering design process (e.g., form, function, measurement tools, and innovations).	CA1, FA2, FA4, FA5, SC8, SS2, H/PE6	1.2, 1.6, 1.9, 2.1, 2.4	1:9-12K, 7:9-12G, 7:9-12M, 9:9-12I
<b>B.</b>	Explore educational requirements, career opportunities, job functions for professions in the design engineering field, and the services provided by professional engineering organizations.	CA1, SS7	1.2, 2.1, 4.8	
<b>C.</b>	Apply the seven design process steps in systematic problem solving.	CA1, FA1	2.1, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	8:9-12H, 8:9-12J
<b>D.</b>	Develop a portfolio that demonstrates evidence of teamwork and mastery of the elements of engineering design in various products, print media, and art forms.	CA1, CA4, CA5, CA6, FA2	1.5, 1.8, 2.1, 4.4, 4.6	2:9-12EE, 9:9-12I, 9:9-12J, 11:6-8L, 12:9-12L
<b>E.</b>	Create properly styled two-dimensional sketches to demonstrate the design process.	FA1, MA2	2.5	11:6-8J
<b>F.</b>	Formulate appropriate pictorial sketches to develop ideas, solve problems, and communicate solutions in the design process.	FA1	2.5	11:6-8J
<b>G.</b>	Apply annotated sketches to communicate design solutions, analyze processes, and convey data in a design solution.	CA4, CA5, FA1	1.5, 2.5, 3.6	11:6-8J, 11:6-8L, 12:9-12L, 17:9-12Q
<b>H.</b>	Construct major geometric shapes using two and three dimensional modeling.	FA1, MA2, MA4	2.5	11:6-8J, 17:9-12Q
<b>I.</b>	Demonstrate knowledge of engineering design concepts, terms, and definitions.	CA1, FA1, FA2, MA2, MA4	1.8, 2.1, 3.4	9:9-12I, 9:9-12J, 11:6-8J, 17:9-12Q
<b>J.</b>	Categorize and select problem solutions in verbal and written format.	CA1	2.1, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	9:6-8G, 9:9-12J, 9:9-12L, 11:9-12R
<b>K.</b>	Apply computer aided mathematical and graphical software programs to the design modeling process.	CA1, MA2, MA4	1.8, 2.5, 3.1, 3.7	11:6-8J, 11:9-12P, 11:9-12R
<b>L.</b>	Demonstrate assembly modeling skills to solve design problems (e.g., sketching, analysis, dimensional, constraints, mass properties, specifications, tolerancing, and annotations).	CA1, CA4, FA1, MA1, MA2, MA4, SC1, SC2, SC7	1.4, 1.5, 1.7, 1.8, 2.1, 2.5, 3.2, 3.3, 3.4, 3.6	9:6-8H, 9:9-12K, 11:6-8J, 11:6-8K, 11:9-12O, 11:9-12P, 12:9-12L, 17:9-12Q
<b>M.</b>	Demonstrate appropriate skills to communicate engineering design topics (e.g., voice techniques, written and visual aids, preparation, audience recognition, and computer applications).	CA1, CA4, CA5	2.1	11:9-12R, 12:9-12L, 17:9-12P

<b>N.</b>	Evaluate material characteristics and requirements needed to manufacture a product (e.g., labor, specifications, constraints, processes, financial considerations, and equipment).	CA1, SC1, SS4	2.1, 3.1, 3.7, 4.5	2:9-12AA, 2:9-12EE, 18:9-12J, 19:6-8F, 19:6-8H, 19:9-12M
<b>O.</b>	Develop a cost analysis for a given product (e.g., production, quality control, materials, handling, facility requirements, and packaging).	MA3, SS4	1.6, 2.5, 3.1, 3.7, 3.8, 4.7	2:9-12DD, 11:9-12N, 11:9-12Q, 12:9-12P, 19:9-12R