



Principles of Engineering


Teacher: Kris Rue


September 2020

Content	Skills	Learning Targets	Assessment
<p>CEQ: How can engineering and problem solving related to the real world.</p> <p></p> <p>A: Simple Machines</p> <p>UEQ: What are simple machines</p> <p>UEQ: What is mechanical advantage?</p> <p>A1: Lever, Wheel & Axle, Pulley</p> <p>A2: Screw, Inclined Plane, Wedge</p>	<p>A: Simple Machines</p> <p>A1: Build a lever and calculate MA</p> <p>A1: Build a W&A and calculate MA</p> <p>A1: Build a pulley and calculate MA</p> <p>A2: Build a screw and calculate MA</p> <p>A2: Build an inclined plane and calculate MA</p> <p>A2: Build a wedge and calculate MA</p>	<p>A: Simple Machines</p> <ol style="list-style-type: none"> 1. I can identify 6 simple machines 2. I can build 6 simple machines 3. I can calculate mechanical advantage 	<p>A: Simple Machines</p> <p>A1-2 CFA: Simple Machines Calculations</p> <p>A1-2CFA: Building Simple Machines</p> <p>A1-2CSA: Simple Machines Quiz</p>
<p></p> <p>B: Materials</p> <p>UEQ: What is a stress/strain curve?</p> <p>UEQ: What are the different types of materials?</p> <p>B1: Materials & Material Properties</p> <p>B2: Material Strength</p>	<p>B: Materials</p> <p>B1: Identify the 6 types of materials</p> <p>B1: Identify the different uses for particular materials</p> <p>B2: Describe a materials stress strain curve</p> <p>B2: Perform stress calculations</p>	<p>B: Materials</p> <ol style="list-style-type: none"> 1. I can identify 6 different types of materials 2. I can describe a stress strain curve 3. I can calculate stress 	<p>B: Materials</p> <p>B1-CFA: Tensile Testing SIM</p> <p>B2-CFA: Engineering Problems</p> <p>B1-CFA: Material Identification</p> <p>B1-2CSA: Material Properties Quiz</p>


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October 2014

Content	Skills	Learning Targets	Assessment
 <p>C: Electricity: UEQ: What is Ohm's Law UEQ: How do I create an electrical circuit?</p> <p>C1: Ohms Law C2: Electric Circuits</p>	<p>C: Electricity</p> <p>C1: Use Ohms law to calculate voltage, current and resistance C2: Create a series circuit C2: Create a parallel circuit</p>	<p>C: Electricity</p> <ol style="list-style-type: none"> 1. I can use Ohm's Law 2. I can create a series circuit 3. I can create a parallel circuit 	<p>C: Electricity</p> <p>C1- CFA: Electricity calcul C2-CFA: Electricity Lab C1-2CSA: Electricity Quiz</p>

 <p>D: Kinematics UEQ: How can I predict a projectiles distance? UEQ: How can I construct a ballistic device?</p> <p>D1: Sketching D2: Inventor D3: Safety D4: Kinematics D5: Kinematics Problem Solving</p>	<p>D: Kinematics</p> <p>D1: Sketching a ballistic device concept D2: 3-D modeling parts for you ballistic device. D2: Assembling (virtul) your ballsitic device D3: Operating tools safely D4: Understanding the language of kinematics D5: Solving kinematics problems</p>	<p>D: Kinematics</p> <ol style="list-style-type: none"> 1. I can sketch a ballistic device concept 2. I can use Inventor to model my Ballistic Device 3. I can use tools safely 4. I can solve for distance and displacement 5. I can solve for speed and velocity 	<p>D: Kinematics</p> <p>D1-5: CSA- Ballistic Devi D1: CFA- Sketch approva D2: CFA-Ballistic Device print off D3: CFA-Safty observatio D5: Kinematics workshe D4-5: CSA-Kinematics Q</p>
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November 2014

Content	Skills	Learning Targets	Assessment
 <p>E: Material Processes UEQ: How are products we use today manufactured? UEQ: What are the different types of processes?</p>	<p>E: Material Processes</p> <p>E1: Research and present a material process</p>	<p>E: Material Processes</p> <ol style="list-style-type: none"> 1. I can identify the different types of processes 	<p>E: Material Processes</p> <p>E1-CSA: Processes Pres E2-CFA: Process Resear</p>

E1: Material Processes



F: Thermodynamics

UEQ: How is heat transferred?

UEQ: How can we calculate heat loss?

F1: Thermodynamics

F2: Putt Putt Boats

F: Thermodynamics

F1: Calculate thermodynamic equations

F1: Identify heat loss

F2: Build a thermo powered boat

F: Thermodynamics

1. I can use thermodynamic equations

2. I can identify 3 forms of heat loss

3. I can create a Putt Putt boat

F: Thermodynamics

F1-CFA: Thermodynamics



F1-CFA: Heat Box Lab

F2-CFA: Putt Putt Boats

F1-2-CSA: Thermodynamics


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December 2014

Content	Skills	Learning Targets	Assessment
 <p>G: Control Systems UEQ: How can we program a machine to complete a task?</p> <p>G1: Basic Programming G2: Machine Control Design</p>	<p>G: Control Systems</p> <p>G1: Understand open and closed loops G1: Understand inputs and outputs G2: Program a basic task for a machine G2: Program a complex task for a machine</p>	<p>G: Control Systems</p> <ol style="list-style-type: none"> 1. I can program an open loop system 2. I can program a closed loop system 3. I can use input and output devices 	<p>G: Control Systems</p> <p>F1-CFA: FT Checkoff ass F1-2-CSA: Marble Sorte</p>
 <p>H: Statistics & Probablility: UEQ: How is statistics used in engineering? UEQ: How is probablility used in engineering?</p> <p>H1. Statistics H2. Probablility</p>	<p>H: Statistics & Probablility:</p> <p>H1: Determine Mean, Mode, Range, Median, and Standard Deviation H2: Determine porbable outcomes</p>	<p>H: Statistics & Probablility:</p> <ol style="list-style-type: none"> 1. I can calculate basic statistics 2. I can caluculate basic probability 	<p>H: Statistics & Probablility:</p> <p>H1-CFA: Cady statistics v H2-CFA-Probablilty Calcu</p>


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January 2015

Content	Skills	Learning Targets	Assessment
 <p>I: Fluids UEQ: How is fluid power utilized?</p> <p>I1: Pneumatics I2: Hydraulics</p>	<p>I: Fluids</p> <p>I1: Build a compressor I1: Calculate pressure I2: Use hydraulics to create MA</p>	<p>I: Fluids</p> <ol style="list-style-type: none"> 1. I can do fluid calculations 2. I can utilize hydraulics to do work 3. I can utilize pneumatics to do work 	<p>I: Fluids</p> <p>I1-CFA: Compressor I1-CFA: Brake Lab I2-CFA: Hydraulics Lab</p>

 <p>J: Statics UEQ: How can I tell if a truss is in tension or compression? UEQ: What forces are acting on a truss?</p> <p>J1: Centroids J2: Free Body Diagrams (FBD) J3: Force Vectors and Moments J4: Truss Forces J5: Moment of Inertia</p>	<p>J: Statics</p> <p>J1: Calculate the COG of a given shape J2: Create a FBD J3: Balance out Vectors and Moments. J4: Determine Tension vs. Compression in a truss J5: Finding moment of inertia.</p>	<p>J: Statics</p> <ol style="list-style-type: none"> 1. I can calculate a centroid 2. I can draw a FBD 3. I can make forces vectors and moments equal zero 4. I can calculate the tension/compression of a truss 	<p>I1-2-CFA: Fluid Calculati I1-2-CSA: Fluids Quiz</p> <p>J: Statics</p> <p>J1-CFA: MD Solids J2-CFA: FBD worksheet J3-CFA: Vectors and Mo J4-CFA: Truss Calculatio J4-CFA: West Point Brid J5-CFA: Autodesk Invent Analysis J1-5-CSA: Bridge Builder</p>
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February 2015

Content	Skills	Learning Targets	Ass
 <p>J: Statics UEQ: How can I tell if a truss is in tension or compression? UEQ: What forces are acting on a truss?</p> <p>J1: Centroids J2: Free Body Diagrams (FBD) J3: Force Vectors and Moments</p>	<p>J: Statics</p> <p>J1: Calculate the COG of a given shape J2: Create a FBD J3: Balance out Vectors and Moments. J4: Determine Tension vs. Compression in a truss J5: Finding moment of inertia.</p>	<p>J: Statics</p> <ol style="list-style-type: none"> 1. I can calculate a centroid 2. I can draw a FBD 3. I can make forces vectors and moments equal zero 4. I can calculate the tension/compression of a truss 	<p>J: S</p> <p>J1-C J2-C J3-C J4-C J4-C J5-C</p>

J4: Truss Forces
J5: Moment of Inertia



K: Alternative Energy

UEQ: How does a fuel cell work?

- K1. Solar Panel
- K2. Fuel Cell

K: Alternative Energy

- K1: Measure reading from a solar panel
- K2: Build a Hydrogen Fuel Cell powered car.

K: Alternative Energy

- 1. I can use a Hydrogen Fuel Cell

Ana
J1-5

K: A
K1-
K1-