

Course Title – Drafting and Design 2	
Implement start year – 2018-2019	
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Unit # 3 - 3D Modeling and Applications	
Transfer Goal – Students will be able to independently create accurate 3D rendered models and appropriate drawings using Computer Aided Drawing (CAD) software.	
Stage 1 – Desired Results	
<u>Established Goals</u> <u>2014 New Jersey Student Learning Standards, Strand(s)/CPI #</u>	<u>21st Century Themes</u> <u>(www.21stcenturyskills.org)</u>
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.	<input checked="" type="checkbox"/> Global Awareness <input type="checkbox"/> Financial, Economic, Business and Entrepreneurial Literacy <input type="checkbox"/> Civic Literacy <input type="checkbox"/> Health Literacy <input checked="" type="checkbox"/> Environmental Literacy
8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. C. Design: The design process is a systematic approach to solving problems. <ul style="list-style-type: none"> 8.2.12.C.7 Use a design process to devise a technological product or system that addresses a global problem, provide research, identify trade-offs and constraints, and document the process through drawings that include data and materials. 	<u>21st Century Skills</u> <i>Learning and Innovation Skills:</i> <input checked="" type="checkbox"/> Creativity and Innovation <input checked="" type="checkbox"/> Critical Thinking and Problem Solving <input checked="" type="checkbox"/> Communication and Collaboration <i>Information, Media and Technology Skills:</i> <input checked="" type="checkbox"/> Information Literacy <input checked="" type="checkbox"/> Media Literacy <input checked="" type="checkbox"/> ICT (Information, Communications and Technology) Literacy

<p>9.1 21st-Century Life & Career Skills All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.</p> <p>9.1.12.A.1 Apply critical thinking and problem-solving strategies during structured learning experiences.</p>	<p><i>Life and Career Skills:</i> _X_Flexibility and Adaptability _X_Initiative and Self-Direction _X_Social and Cross-Cultural Skills _X_Productivity and Accountability _X_Leadership and Responsibility</p>
<p><u>Enduring Understandings:</u> <i>Students will understand that . . .</i></p> <p><i>EU 1</i> 3D modeling software, such as Inventor, is used to communicate ideas and objects.</p> <p><i>EU 2</i> 3D modeling software has advantages over 2D software.</p>	<p><u>Essential Questions:</u></p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> • How has technology impacted the design field? • How would various careers benefit from the use of 3D modeling software? • What role do 3D modeling tools have in the process of design? • How is a 3D drawing used in place of 2D drawing? <p><i>EU 2</i></p> <ul style="list-style-type: none"> • How has 3D modeling software programs improved and changed the design process? • How are working drawings utilized?
<p><u>Knowledge:</u> <i>Students will know . . .</i></p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> • the user interface of 3D modeling software. • 3D CAD commands, such as: extrude, revolve, sweep, plane, and loft. • 3D drawing space is defined by axes and planes. • 3D CAD software allows for ease of modifications, material selection, access to physical attributes, and precision. <p><i>EU 2</i></p> <ul style="list-style-type: none"> • 3D modeling software can create multiple file types such as: .ipt, .idw, .ipn, .iam. 	<p><u>Skills:</u> <i>Students will be able to . . .</i></p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> • locate features within the user interface. • utilize 3D software to reproduce an existing drawing. • draw an object using the 3 axes and planes. • use 3D software drawing aids. <p><i>EU 2</i></p> <ul style="list-style-type: none"> • convert 3D part files to 2D drawings.

<ul style="list-style-type: none"> • 3D modeling software allows for an object to be rendered. • working drawings consist of: multiview, assembly, exploded assembly, sectional, and pictorial. • advantages of 3D modeling software allow for working drawings to be produced from a part file. 	<ul style="list-style-type: none"> • utilize software to generate parts lists. • compare/contrast advantages of 3D modeling vs 2D CAD. • create a drawing more efficiently using 3D modeling software compared to 2D CAD. • create a set of working drawings.
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Stage 2 – Assessment Evidence

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<p>Other Recommended Evidence:</p> <ul style="list-style-type: none"> • Design Challenges • Teacher observations • Project rubric(s) • Worksheets • Quizzes/tests • Drawing Packets • Engineering notebook
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Stage 3 – Learning Plan

Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections:

- Teacher led discussions about 3D modeling uses, functions, and real-world applications (A)
- User interface worksheet (A,M)
- Master Command List Worksheet (A,M)
- Teacher led discussions on the proper 3D modeling techniques (A)
- Practice new 3D modeling skillsets (M)
- Demonstrate proper CAD commands by completing various basic drawings (M, T)
- Reproduce 3D models (M)
- Dimensioning and Annotation in 3D software demonstration (A)
- Demonstrate 3D to 2D functions (A)
- Reproduce various technical models (M, T)
- Section view demonstration (A)
- Guided tutorials (A,M)
- Demo-a-Day (explaining a command each day) (A)
- Question-a-Day (posting EQ on the board) (A)
- Teacher led discussion/demonstration on components of working drawings and their applications (A, M)
- Modeling objects brought in from home (M, T)
- Teacher created Design Challenges using the engineering design process (M, T)