

Effective Date: 2010

Hamburg Area School District

Name of Course: Computer Aided Drafting 2
Department: Industrial Technology and Engineering

Grade Level: 10-12
Instructional Time: 180 days
Length of Course: 30 cycles
Period Per Cycle: 6
Length of Period: 43 minutes

Texts and Resources:

Engineering Drawing and Design
Harnessing AutoCAD 2010
Using AutoCAD 2010
Mechanical Drawing – CAD Communications
Drafting and Design
Introducing AutoCAD 2010
AutoCAD and its Applications: Basics
AutoCAD and its Applications: Advanced
.autodesk.com
.afsonl.com
.thebluebook.com

Assessments:

Individual Projects
Group Projects
Chapter Questions
Tests and Quizzes
Self Evaluations
Rubrics
Demonstrations

**Hamburg Area School District
Course Plan
Computer Aided Drafting 2**

**Course Name: Computer Aided Drafting 2
Unit: CAD Basics Review**

Time Line: 4 cycles

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
What are the fundamentals of sketching?	<ul style="list-style-type: none"> • Accurately sketch lines, circles, arcs, and other geometric shapes • Recognize and produce multi-view sketches • Recognize and sketch isometric drawings • Utilize the block technique to produce sketches 	3.4.10.B4. 3.4.10.C1.
How are lines and lettering used in drafting?	<ul style="list-style-type: none"> • Identify lines found on a given industry drawing • Draw ASME standard lines using manual drafting and computer-aided drafting • Solve engineering problems using manual and computer-aided drafting • Use lettering equipment to produce freehand letters • Use a CADD system to create text 	3.4.10.B4.
What is geometric construction?	<ul style="list-style-type: none"> • Draw parallel and perpendicular lines • Construct bisectors and divides lines and spaces into equal parts • Accurately draw polygons, tangencies, and ellipses • Solve an engineering problem by making a formal drawing with geometric constructions from an engineer's sketch or layout 	3.4.10.B4.
What are the basics of multi-view drawings?	<ul style="list-style-type: none"> • Prepare single and multi-view drawings • Select appropriate views for presentation • Draw view enlargements • Establish run outs • Explain the difference between first and third angle projections • Prepare formal multi-view drawings from an engineer's sketch and actual industry layouts 	3.4.10.E4 3.4.12.E4

**Hamburg Area School District
Course Plan
Computer Aided Drafting 2**

Course Name: Computer Aided Drafting 2

Unit: Introduction to Three-Dimensional Modeling

Time Line: 6 cycles

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
What are the basic concepts of three dimensional modeling?	<ul style="list-style-type: none"> • Describe how to locate points in 3D space • Describe and utilize the right-hand rule of 3D visualization • Explain the function of the ribbon • Display 3D objects from preset isometric viewpoints • Display 3D objects from any desired viewpoint • Edit a current visual style 	3.4.10.E4 3.4.12.E4 3.4.10.C1.
How are primitives and composites created?	<ul style="list-style-type: none"> • Construct 3D solid primitives • Explain the dynamic feedback presented when constructing solid primitives • Create complex solids using the UNION command • Remove portions of a solid using the SUBTRACT command • Create a new solid from the interference volume between two solids • Create regions 	3.4.10.E4 3.4.12.E4 3.4.10.C1.
What are the basics of mesh modeling?	<ul style="list-style-type: none"> • Explain tessellation division and values • Create mesh primitives • Create a smoothed mesh object • Create a refined mesh object • Construct mesh forms • Generate a mesh by converting a solid • Generate a mesh by converting a surface • Generate a surface by converting a mesh • Generate a solid by converting a mesh • Execute editing on mesh objects • Create a split face on a mesh • Produce an extruded mesh face • Apply a crease to mesh subobjects 	3.4.10.E4 3.4.12.E4

**Hamburg Area School District
Course Plan
Computer Aided Drafting 2**

Course Name: Computer Aided Drafting 2

Unit: Introduction to Three-Dimensional Modeling

Time Line: 6 cycles

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
How are 3D models viewed and displayed?	<ul style="list-style-type: none">• Use the view cube to dynamically rotate the view of the model in 3D space• Use the view cube to display orthographic plan views of all sides on the model• Use steering wheels to display a 3D model from any angle• Use the visual style options to create face and edge style display variations• Render a 3D model	3.4.10.E4 3.4.12.E4

**Hamburg Area School District
Course Plan
Computer Aided Drafting 2**

**Course Name: Computer Aided Drafting 2
Unit: Essentials of 3D Drafting**

Time Line: 15 cycles

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
How is show motion used to view a model?	<ul style="list-style-type: none"> • Explain the use of the show motion tool • Create still shots of 3D models • Create cinematic shots of 3D models • Replay single shots and a sequence of shots • Change the properties of a shot 	3.4.10.E4 3.4.12.E4
What are 3D coordinates and user coordinate systems?	<ul style="list-style-type: none"> • Describe rectangular, spherical, and cylindrical methods of coordinate entry • Draw 3d polylines • Describe the function of the world and user coordinate systems • Move the user coordinate system to any surface • Rotate the user coordinate system to any angle • Change the user coordinate system to match the plane of a geometric object • Use a dynamic UCS • Save and manage user coordinate systems • Restore and use named user coordinate systems • Control user coordinate system icon visibility in viewports 	3.4.10.E4 3.4.12.E4
How are model space viewports used?	<ul style="list-style-type: none"> • Describe the function of model space viewports • Create and save viewport configurations • Alter the current viewport configuration • Use multiple viewports to construct a drawing 	3.4.10.E4 3.4.12.E4
How are 3d text and dimensions created?	<ul style="list-style-type: none"> • Create text with a thickness • Draw text that is plan to the current view • Dimension a 3d drawing 	3.4.10.E4 3.4.12.E4

**Hamburg Area School District
Course Plan
Computer Aided Drafting 2**

**Course Name: Computer Aided Drafting 2
Unit: Essentials of 3D Drafting**

Time Line: 15 cycles

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
How are solid models extruded and revolved?	<ul style="list-style-type: none"> • Create solids and surfaces by extruding 2D profiles • Extrude planar surfaces • Create symmetrical 3d solids surfaces by revolving 3d profiles • Revolve planar surfaces • Use solid extrusions and revolutions as construction tools 	3.4.10.E4 3.4.12.E4
What are sweeps and lofts and how are they used in solid modeling?	<ul style="list-style-type: none"> • Sweep 2d shapes along a 2d or 3d path to create a solid or surface object • Create 3d solid or surface objects by lofting a series of cross sections 	3.4.10.E4 3.4.12.E4
How do you work with and create details on solid models?	<ul style="list-style-type: none"> • Change properties on solids • Align objects • Rotate objects in three dimensions • Mirror objects in three dimensions • Create 3d arrays • Fillet solid objects • Chamfer solid objects • Thicken a surface into a solid • Convert planar objects into surfaces • Slice a solid using various methods • Constructs details on solid models • Remove features from solid models 	3.4.10.E4 3.4.12.E4

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**Course Name: Computer Aided Drafting 2
Unit: Essentials of 3D Drafting**

Time Line: 15 cycles

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
How are subobjects edited?	<ul style="list-style-type: none"> • Select subobjects(faces, edges, vertices) • Edit solids using grips • Edit face subobjects • Edit edge subobjects • Edit vertex subobjects • Extrude a closed boundary suing the PRESSPULL command • Extract a wireframe from a 3d solid using the XEDGES command 	3.4.10.E4 3.4.12.E4
How are solid models edited?	<ul style="list-style-type: none"> • Change the shape and configuration of solid object faces • Copy and change the color of solid objects edges and faces • Break apart a composite solid composed of physically separate entities • Use the SOLIDEDIT command to construct and edit a solid model 	3.4.10.E4 3.4.12.E4
How are solid models displayed and analyzed?	<ul style="list-style-type: none"> • Control the display of solid models • Construct a 3d section plane through a solid model • Adjust the size and location of section planes • Create a dynamic section of a 3d solid model • Construct 2d and 3d section blocks • Create a flat , 2d projection of a 3d solid model • Create a multi-view layout of solid model using SOLVIEW and SOLDRAW • Construct a profile of a solid using SOLPROF • Perform an analysis of a solid model • Export and import solid model data 	3.4.10.E4 3.4.12.E4

**Hamburg Area School District
Course Plan
Computer Aided Drafting 2**

**Course Name: Computer Aided Drafting II
Unit: Model Visualization and Presentation**

Time Line: 5 cycles

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
What are the essentials of basic rendering and visual style settings?	<ul style="list-style-type: none"> • Describe the visual style manage palette • Change the settings for visual styles • Create custom visual styles • Export visual styles to a tool palette • Render a scene using sunlight • Save a rendered images from the Render window 	3.4.10.E4 3.4.12.E4
What materials and available in AutoCAD?	<ul style="list-style-type: none"> • Attach materials to the objects in a drawing • Changes the properties of existing materials • Create new materials 	3.4.10.E4 3.4.12.E4
How does one use lighting in AutoCAD?	<ul style="list-style-type: none"> • Describe the types of lighting in AutoCAD • List the user-created lights available in AutoCAD • Changes the properties of lights • Generate and modify shadows • Add a background to your scene and control its appearance 	3.4.10.E4 3.4.12.E4
What are advanced rendering techniques?	<ul style="list-style-type: none"> • Make advanced rendering settings • Set the resolution for a rendering • Save a rendering to an image file • Add fog/depth cueing to a scene 	3.4.10.E4 3.4.12.E4
How are walkthroughs and flybys used to visualize solid models?	<ul style="list-style-type: none"> • Create a camera to define a static 3d view • Activate and adjust front and back clipping planes. • Record a walkthrough of a 3d model to a movie file • Record a flyby of a 3d model to a movie file 	3.4.10.E4 3.4.12.E4
How are raster, vector, and web graphics used in AutoCAD?	<ul style="list-style-type: none"> • Compare raster and vector files • Import and export raster files using AutoCAD • Import and export vector files using AutoCAD • Set image commands to manipulate raster files • Create DWF, DWFx, and PDF files 	3.4.10.E4 3.4.12.E4

