Engineering Design I - Course Outline		Points Possible	Course Hours
Course Overview			**7**
Lab 1: Start the Course			
	Identify computer requirements.		
	Learn how to move through the course.		
	Switch between windows.		
Lab 2: Set Up Your Computer			
	Find files and folders on a computer.		
	Set up a computer to show the List folder view and file name extensions.		
	Make a course folder.		
Lab 3: Set Up a Browser and Install 7-Zip			
	Set up a Web browser.		
	Download and install a zip utility.		
Lab 4: Download Resources and Zip Assignments			
	Get the course resources.		
	Install software.		
	Learn about finding, completing, and turning in assignments.		
	Zip and unzip files and folders.		
Health and Safety in the Workplace			**1**
	Define ergonomics and repetitive strain injury.		
	Identify common tips for better ergonomics while using computers.		
	Define OSHA (Occupational Safety and Health Administration).		
	Define Material Safety Data Sheets (MSDS).		
Computer Basics			**1**
	Define hardware, software, software programs, and operating systems.		
	Identify how to start and shut down a computer.		
	Identify input devices, output devices, and storage devices.		
	Identify tips for taking care of computer equipment.		
	Identify how to open a Help center on a computer.		
	Identify how to search a computer.		
Project 1: Create Shapes			**10**
Lab 1: Explore CAD			
	Define engineering and computer-aided design (CAD).		
	Identify common types of engineering and CAD-based careers.		
	Identify the differences between freehand drawing, technical drawing, and CAD drawing.		
	Define drafting and identify the purpose of common drafting tools.		
Lab 2: Set Up a Drawing			
	Create a new blank drawing in CadStd.		
	Set up the page size and orientation.		
	Set up the grid and snap.		
	Save a .cad file.		
	Use CadStd's Help page.		
	Create and delete lines.		
	Use the Undo and Redo buttons.		
Lab 3: Use Coordinates			
	Draw lines using absolute coordinates.		
	Draw lines using relative coordinates.		
	Plot points using a Cartesian coordinate system.		
Lab 4: Create a House			
	View a drawing by zooming, moving the drawing around, and returning to normal view.		
	Use the Rectangle Tool and Line Tool to draw shapes and lines.		
	Use the Change Entity Tool to change the shape of an object.		
	Use the Snap To End, Snap Intersection, and Snap To Mid Point commands.		

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Lab 5: Create a Face			
	Draw circles, ellipses, and arcs.		
	Copy, move, mirror, and rotate objects.		
	Use the Snap Center command to place an object in the center of a circle.		
Assignment 1A			
	See assignment description document for detailed instructions.	**20**	
Assignment 1B			
	See assignment description document for detailed instructions.	**35**	
Project 2: Create Orthographic Drawings			**12**
Lab 1: Explore Orthographic Projections			
	Define 2-D and 3-D.		
	Define orthographic projection.		
	Identify the six main views of orthographic projection.		
	Identify the three views used in a three-view orthographic drawing.		
	Visualize 3-D objects from different views.		
Lab 2: Draw a Front View			
	Define alphabet of lines.		
	Define visible lines and construction lines.		
	Define layers.		
	Use construction lines to draw a front view.		
	Use layers to hide construction lines.		
Lab 3: Draw Two Views			
	Define dimensions.		
	Use dimensions and the grid to figure out the lengths of lines.		
	Identify the importance of accurate drawings.		
	Draw a front view and top view of a three-view orthographic drawing.		
Lab 4: Draw a Three-View Orthographic Drawing			
	Define hidden lines and visualize views with hidden lines.		
	Define scale and layout.		
	Apply guidelines for choosing a front view.		
	Draw a three-view orthographic drawing with hidden lines.		
Lab 5: Draw a Hole			
	Visualize orthographic views with holes.		
	Define symmetry.		
	Define center line.		
	Draw a hole using the Circle Tool, hidden lines, and center lines.		
Quiz Study Guide			
	Review the quiz study guide before taking the quiz.		
Quiz 1			
	Quiz on Project 1 and Project 2	**10**	
Assignment 2A			
	See assignment description document for detailed instructions.	**50**	
Assignment 2B			
	See assignment description document for detailed instructions.	**30**	
Project 3: Draw Sectional Views			**6**
Lab 1: Explore Sectional Views			
	Define sectional view.		
	Define plane, cutting plane, and cutting plane line.		
	Define section lines.		
	Visualize sectional views of 3-D objects.		
Lab 2: Draw a Sectional View			
	Draw the outside and inside lines of a 3-D object for a sectional view.		
	Add center lines to holes in a sectional view.		
	Define angle.		
	Draw section lines.		

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Lab 3: Place Cutting Planes			
	Draw cutting plane lines on orthographic views.		
	Use the Arrow Tool to add arrows to the cutting plane lines.		
	Place cutting plane lines so they cut through important features.		
	Define full section, half section, and offset section.		
	Draw a cutting plane line for an offset section.		
Assignment 3			
	See assignment description document for detailed instructions.	**40**	
Project 4: Create an Isometric Drawing			**8**
Lab 1: Explore Pictorial Drawings			
	Define pictorial drawing, tonal shading techniques, and depth.		
	Identify types of pictorial drawings, such as axonometric, oblique, and perspective.		
	Define isometric drawing.		
	Identify measurements that can be taken from an isometric drawing.		
Lab 2: Draw with Angles			
	Use distance and angle measurements to draw lines in CAD.		
	Draw an isometric drawing.		
	Arrange three views and an isometric drawing on a page.		
Quiz Study Guide			
	Review the quiz study guide before taking the quiz.		
Quiz 2			
	Quiz on Project 3 and Project 4	**10**	
Assignment 4A			
	See assignment description document for detailed instructions.	**20**	
Assignment 4B			
	See assignment description document for detailed instructions.	**30**	
Project 5: Create an Oblique Drawing			**4**
Lab 1: Explore Oblique Drawings			
	Define oblique drawing.		
	Identify which lines can be measured accurately in an oblique drawing.		
	Define foreshortening.		
	Calculate the real depth of a foreshortened object in an oblique drawing.		
Lab 2: Draw with Oblique Angles			
	Draw foreshortened lines of depth.		
	Draw an oblique drawing.		
	Arrange three views and an oblique drawing on a page.		
Assignment 5			
	See assignment description document for detailed instructions.	**20**	
Project 6: Create a Perspective Drawing			**5**
Lab 1: Explore Perspective Drawings			
	Define vanishing point and horizon line.		
	Identify common types of perspective, such as one-point, two-point, and three-point perspective.		
	Identify the main purpose of perspective drawings.		
	Sketch in one-point, two-point, and three-point perspective.		
Lab 2: Draw in Two-Point Perspective			
	Use vanishing points and construction lines to draw a cube in two-point perspective.		
	Change the cube into a different 3-D object, still in two-point perspective.		
Assignment 6A			
	See assignment description document for detailed instructions.	**10**	
Assignment 6B			
	See assignment description document for detailed instructions.	**20**	

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Project 7: Draw an Auxiliary View			**5**
Lab 1: Explore Auxiliary Views			
	Define auxiliary view.		
	Identify the purpose of auxiliary views.		
	Identify names of auxiliary views.		
	Visualize auxiliary views of 3-D objects.		
Lab 2: Draw with a Reference Plane			
	Define perpendicular.		
	Define reference plane.		
	Draw a reference plane line.		
	Use a reference plane and construction lines to draw an auxiliary view.		
Quiz Study Guide			
	Review the quiz study guide before taking the quiz.		
Quiz 3			
	Quiz on Project 5, Project 6, and Project 7	**10**	
Assignment 7			
	See assignment description document for detailed instructions.	**20**	
Project 8: Dimension Drawings			**7**
Lab 1: Dimension a Block			
	Define dimensioning, dimension line, and extension line.		
	Define aligned dimensions and unidirectional dimensions.		
	Set the dimension settings.		
	Apply guidelines for good dimensioning.		
Lab 2: Use Baseline Dimensioning			
	Define relative dimensioning and baseline dimensioning.		
	Use baseline dimensioning to dimension an object.		
	Apply guidelines for good dimensioning.		
Lab 3: Dimension a Circle			
	Identify reasons for dimensioning, such as for size and location.		
	Use a leader line and the Text Tool to dimension a circle.		
	Apply guidelines for good dimensioning.		
Lab 4: Explore Complex Dimensioning			
	Identify ways that CAD standards apply to dimensioning.		
	Define dimensioning styles.		
	Define dimension line terminator.		
	Interpret drawings with advanced features, such as center line dimensioning, dual dimensioning, tolerance, and theoretical points of intersection.		
Assignment 8			
	See assignment description document for detailed instructions.	**50**	
Project 9: Create Working Drawings			**9**
Lab 1: Explore Working Drawings			
	Define working drawings.		
	Identify the contents of working drawings as detail drawings, assembly drawings, and a bill of materials.		
Lab 2: Draw a Title Block			
	Define title block and border line.		
	Draw a border.		
	Draw a title block.		
	Add attributes to a title block.		
Lab 3: Draw a Detail Drawing			
	Draw a detail drawing.		
	Set dimension settings.		
	Dimension an orthographic view to a center line.		

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Lab 4: Create a Bill of Materials			
	Draw a bill of materials.		
	Use balloons to label parts of an assembly drawing.		
	Add information about the parts to the bill of materials.		
Lab 5: Export Working Drawings			
	Identify ways to work well with clients.		
	Export .cad files to .dxf files, in proper order for a set of working drawings.		
Quiz Study Guide			
	Review the quiz study guide before taking the quiz.		
Quiz 4			
	Quiz on Project 8 and Project 9	**10**	
Assignment 9			
	See assignment description document for detailed instructions.	**50**	
Project 10: Create a 3-D Design			**10**
Lab 1: Explore 3-D Space			
	Define template.		
	Define model.		
	Use various tools to navigate a 3-D CAD environment.		
Lab 2: Draw Edges and Surfaces			
	Create and save a SketchUp project.		
	Define edge and surface.		
	Define snap and point inference.		
	Use the Line Tool, point inferences, and dots to draw edges.		
	Erase, undo, and redo work.		
Lab 3: Create a House			
	Define primitive.		
	Use a basic shape to create a 3-D object.		
	Move and rotate a 3-D object.		
	Apply patterns and color to a 3-D object.		
Lab 4: Add Objects to the Yard			
	Use the Measurements box to create objects of specific size.		
	Carve objects with the Push/Pull Tool.		
	Use the Follow Me Tool to create a 3-D object by moving a shape along a path.		
	Define standard part.		
	Import a model.		
Lab 5: View Your Design and Reduce File Size			
	View a design in various 2-D orthographic views.		
	View a design through a walkthrough.		
	Group parts to remove them for better viewing.		
	Purge old information to reduce the file size.		
Quiz Study Guide			
	Review the quiz study guide before taking the quiz.		
Quiz 5			
	Quiz on Project 10	**10**	
Assignment 10			
	See assignment description document for detailed instructions.	**45**	
Exploring Design			**5**
Lab 1: The Design Process			
	Identify the main stages of the design process.		
	Identify common roles for people working on a team project.		
	Identify common challenges involved with scheduling a project.		

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Lab 2: Designing for People and the Environment			
	Define ecology, green design, and sustainability.		
	Identify common challenges involved in designing for sustainability.		
	Identify ways to design for people with various levels of physical ability.		
	Describe the challenges involved in designing for people's needs, values, and social patterns.		
Quiz 6			
	Quiz on Exploring Design	**10**	
	Total	**500**	**90**

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