

Lesson Plan:

NOTE: This schedule is under ideal conditions. There is a great deal of material to cover such that modifications of this schedule are possible. Changes will be posted. Other changes can occur due to holidays, snow days and other possible unforeseen disruptions.

Instructor Notes:

This course has been updated from previous course to align more closely with the deliverables as spelled out on the course outline. Course begins using ACAD but quickly dives into ACAD Electrical. There is little room or time to discuss 3D modules or use Inventor as was done in previous course. The goal is to give students exposure to real work Industrial Prints with respect to Plant Floor Operations. There will be some design components as well but a good mix is essential.

Class has been interlocked with PLC / HMI in that the same Toggle Function is used in the Midterm as part of the drawing practice. It is important that students unfamiliar with (ie: never having been exposed to) electrical design begin to see some familiar circuitry to help them be more comfortable with the material.

The goal is to draw the PLC in V112 A lab as part of their final assignment.

Lesson Plan:

Lesson	Power Point / Topics	Power Point	Homework / Tests
<p>Week 1 2Sept19</p>	<p>DRFT9106 – Introduction and Lecture 2</p> <ul style="list-style-type: none"> • Instruction and Overview • Log in and test • Menus, Ribbon, Tools, F-Keys, Command Bar, Typing Commands • Open a file, pan, zoom, grid, save-as, file locations. (Using Practice 1a) • Help Function • Sample project • Assign Homework <p>Discussion regarding the use of ACAD and ACAD Electrical in Industrial Environments. This is NOT a design course that models 3D parts or relies heavily on dimensioning, part machinability, manufacturing or assembly.</p> <p>Emphasis on good note taking, proper saving of files and information and how to submit assignments. Lost files are not a good reason to be late or not hand in a submission.</p> <p>Assignment is just a questionnaire to gage students prior experience with regards to ACAD, Design, Automation or other similar areas that relate to this course. Chances are this is the first time students have been exposed to any of these concepts from an industrial perspective although there will be some mature students who being with them some work related experience.</p> <p>After introduction lecture, start “CAD for Engineers Lecture 1.”</p> <p>Students and open Sample Drawings and get a feel for viewing using the tools provides. Review location of ACAD Tutorial Files. View, Pan, Zoom, Grid. (note only using one view and also discussion paper space).</p> <p>Goal is to familiarize students with Basic ACAD right from the beginning regardless of prior experience.</p>	<p>Slides: Intro: 1 to 15 Lesson #1: 1 to 38</p>	<p>Email Assignment (Due midnight 13Sept19)</p> <p>Assignment 1 (due midnight 13Sept19)</p>

<p>Week 2 9Sept19</p>	<p>DRFT9106 – Lecture 2 (Continued)</p>		<p>Assignment 2 (due midnight 17Sept19)</p>
	<ul style="list-style-type: none"> • Drawing Intro • Title Block • Layers • Object Snap • Basic drawing by X,Y Coordinates, Polar and Relative • Using template files provided • Use Practise 2a for lecture • End of lecture is instructions for Assignment #2 <p>Discuss the importance of knowing the basic working of ACAD and the strength of some of the drawing tools provided. Student will begin with a basic template and learn to add their name to the drawing.</p> <p>Continue with Lecture #1 to explore basic ACAD. Begin tutorial in class and step students though some basic drawing using X, Y Polar and Relative Coordinates. Show how to use layers Setting current layer, turning ON/OFF and discuss the strength of layers ... and some of the drawbacks.</p> <p>Note that many floor drawings, especially the ones used in Industry, are printed in B/W due to cost and readability issues. Color is great on a drawing, but not beneficial on the shop floor. Drawing can be in Color but printing is generally done in Monochrome. Show how to print (same response to zoom-all, window, and extents).</p> <p>Might be a good idea to use different examples then the homework. Maybe just some slight changes so the students will have to redraw. Student who saved during the Tutorial had an advantage over those who</p> <p>Log into Linda.com to ensure videos are ready.</p> <p>Assignment at end of class. Emphasise that all shapes must be on separate layers and name must be included on Title Block.</p>		

<p>Week 3 16Sept19</p>	<p>DRFT9106 – Lecture 3</p> <ul style="list-style-type: none"> • File types • Templates • Objects • Detailed Tools • Using Snaps, Snap Over-rides, Placing Parts • Using Extension for Snapping and Placing • Dimensioning • Layouts • Details • Using Previously learned skills such as X, Y, Polar and Relative Placement <p>This a more detailed look at commands and tools introduced during the first few lectures. This include editing automatic setting of features such as Object Snap (OSNAP) and also how to over-ride these settings when needed.</p> <p>Home work assignment is student driving tutorial consisting of 10 exercise. The Student is required to log into Blackboard and answer a questionnaire on whether or not the assignment was completed.</p> <p>Files: Practice 4a, 4b, 4c, 4d, 5e, 4f, 5a, 5b, 5c, 5d</p>	<p>Drawing Precision in ACAD Slides: 1 to 15</p>	<p>Assignment 3 (due midnight 24Sept19)</p>
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<p>Week 4 23Sept19</p>	<p>DRFT9106 – Lecture 4</p>		<p>Layers: Slides: 1 to 13</p>	<p>Assignment 4 (Quiz due in class)</p>
	<ul style="list-style-type: none"> • ACAD Review of material covered to date. (see list below). • Start with Chapter 6.1 in the text (Snap, copy, rotate) – Quiz at start of class. • Use Diagram.dwg • Allowable time for quiz 10-15min (upload to Blackbaord when complete) • Drawing arcs – Demo • Layers PPT (Summary and Advanced) • Polyline Discussion – Draw sample provided (Use Polar / Dynamic) • Break, Lengthen, Insert, Tangent, Move, Width 	<ul style="list-style-type: none"> • Review what has been covered to date: • Introduction to ACAD and drawings • Coordinate Entry Methods – Cartesian, Polar, Relative, Dynamic • User Interface • Status Bar • Drawing Tabs – Model & Paper Space • Navigation • View – Pan, Zoom, User Interface • Create New Empty • Create New from Template 		

<p>Week 5 30Sept19</p>	<p>DRFT9106 – Lecture 5</p>		
	<p>Discussion regarding basic panel designs and concepts. Show students a photo of a panel and discuss the major sections of the panel and what they do. PLC / Relay / HMI / Power On/Off PB's</p> <p>Covers Power Drop, Fusing, Transformers including a Simple Starter Circuit.</p> <p>Importance of planning using CAD and Photos to create a block diagram of the panel layout followed up by placing and laying out the components.</p> <p>Tools to create Panel Layouts & Schematic Designs</p> <p>Handout Sheets from real example:</p> <ul style="list-style-type: none"> • Cylinder head / block washer (sideview showing basic component layout) • Power layout including MCR • PLC Input Cards • Interlock Diagram • Panel Layout with Head Calcs (basic diagram) • HMI Layout (basic diagram) • GE Powermate D connection diagram <p>The idea here is to spend the lesson in discussion and demonstration using real work drawing. The student are given hard copies of each drawing as well as the dwg file. Being able to spend 10-15 min on each drawing is critical in helping increase their understanding of Industrial Systems.</p> <p>The homework for this session is to review what we have covered to date, including the sample prints, to ensure their understanding going forward. Students lost at this point have a chance to come forward to discuss issues, ask questions.</p> <p>Using: DRFT9106_P1.dwg Located in: C:\users\<login id="">\documents\Acade 2019\AeData\Proj\Tutorial\</login></p>		<p style="text-align: center;">Assignment 5 (Review handouts from class, the preps students for the next week when ACAD Electrical is Started)</p>

<p>Week 6 7Oct19</p>	<p>DRFT9106 – Lecture 6</p> <p>So far the Students have been given the basics of AutoCAD ... enough to get started with some standard drawings.</p>	<p>None – tutorial</p>	<p>Assignment 6 (hand in the drawing completed during the tutorial session via Blackboard)</p>
	<p>Start up ACAD Electrical</p> <p>Show where Tutorial Files are located and make sure Students understand this is where they are. Although AutoCAD Lesson move the AEGS to the root directory, there is no reason students can not work directly with the training files since the computer reloads at reboot. However, on the school laptop, create a full backup of the Tutorial Directory so it can be reloaded when needed. Currently best to copy files to a new Subdirectory named AEGS under the root.</p> <p><i>C:\users\<login id>\documents\Acade 2019\AeData\Proj\Tutorial\</i></p> <p>Brief discussion regarding the power of AutoCAD Electrical.</p> <ul style="list-style-type: none"> • Show by example: • Opening a Project • Project Manager • Add a Drawing (load the correct Template) • Settings ... basic • Settings ... component and wire numbers to match what we discussed last week using (%S, %N, %D, %X, %F and %G) <p>Tutorial to build a drawing handed out in class as an example.</p> <p>Emphasis to student that they must practice during the next week (hint, hint!!!)</p> <p>Using: DRFT9106_P1A.dwg Located in: <i>C:\users\<login id>\documents\Acade 2019\AeData\Proj\Tutorial\</i></p>		

<p>Week 7 14Oct19</p>	<p>DRFT9106 – Lecture 7 (EXAM)</p> <hr/> <p><i>Exam</i></p> <p><i>Exam very closely resembles the drawing used in the Tutorial during week 6.</i></p> <p><i>Students receive a hardcopy of the assignment and the drawing they need to recreate.</i></p> <p>Using: DRFT9106_Midterm_Instructor.dwg Located in: C:\users\<login 2019\aedata\proj\tutorial\<="" id>\documents\acade="" p=""> </login></p>		
<p>Week 8 21Oct19</p>	<p>READING WEEK</p>		

<p>Week 9 28Oct19</p>	<p>DRFT9106 – Lecture 8</p> <p>Review of exam result and the most common errors Begin to practice report generation.</p>	<p>None - tutorial</p>	<p>Assignment 7 (hand in the drawing completed during the tutorial session via Blackboard)</p>
	<p>Start up ACAD Electrical for Reports</p> <p>Remind students where the Tutorial Files are located and make sure Students understand this is where they are. For this lesson, use WDDEMO project which should already be in the List of Available Projects.</p> <p><i>C:\users\<login id="">\documents\Acade 2019\AeData\Proj\Demo</login></i></p> <p>Continue discussion regarding the power of AutoCAD Electrical.</p> <ul style="list-style-type: none"> • Adding components from catalog • Good planning • How it was done “in the old days” • AutoCAD Electrical is just a “Tool” ... a Designer, Technician, Engineer does not HAVE to used the tool. • Tasks → Update I/O Card Listing, Rename and Insert Sheets into a project <p>Students will have a bit of practice using AutoCAD Electrical Projects by renaming and renumbering a few sheets to make room for a new I/O sheet to be added.</p> <p>Good discussion involving Real World Application where the insertion of a sheet is necessary, but care must be taken to not have previous drawings adversely affected.</p> <p>Follow tutorial notes created from Lynda.com lessons in Acade.</p> <ul style="list-style-type: none"> • Create new Demo08.dwg and Reports11.dwg. • Rename existing Demo08.dwg → Demo09.dwg • Rename existing Demo09.dwg → Demo10.dwg <p>Tutorial in class to be handed in (files uploaded to Blackboard) by Midnight next day (new page 8 and 11).</p>		

<p>Week 10 3Nov19</p>	<p>DRFT9106 – Lecture 9</p> <p>Continue with Tutorial</p> <hr/> <p>Open AutoCAD Electrical and restore Project Files form last week.</p> <p><i>C:\users\<login id>\documents\Acade 2019\AeData\Proj\Demo\</i></p> <p>Continue discussion regarding the power of AutoCAD Electrical and a reminder to use only AutoCAD Electrical Editing menus. In this Lesson we edit existing Demo02.dwg and Demo08.dwg during class.</p> <ul style="list-style-type: none"> • Cable Markers (Deleting and Adding) • WBlocks to save entire circuits for re-use. • Adding new Circuits directly to the Icon Symbol Library • Using Copy and Move • Using Circuit Clip (copy from one sheet to another) • Using Project Task to save running a script until necessary – demonstrate by removing/editing LS406 to LS1000 • Review of Object Placement using the Alignment Tool • Use the Surf Tool to find component references <p>Large drawing sets may require 2 to 3 minutes of processing time to save and update when wire or other components are edited, and references must be updated. Follow tutorial notes created from Lynda.com lessons Acade.</p> <p>Spend some time showing students how to add buttons to a panel by using the Panel Tab and the Panel Icon Selections.</p> <p>Assignment will be to add two more pages to the drawing set and adding a PB Button Box as a remote panel. Students are responsible to find what I/O should be in need of a Panel.</p> <ul style="list-style-type: none"> • Create new Demo10.dwg and Demo11.dwg. • Rename existing Demo10.dwg → Demo12.dwg • Rename existing Demo11.dwg → Demo13.dwg 		<p style="text-align: center;">Assignment 8</p> <p>Hand in the drawings as per the assignment document. Students are now required to print B/W copies of their submission on 11x17 paper.</p> <p>Title Blocks must be correct and similar to the Midterm Exam requirements.</p> <p>They must also upload a copy to Blackboard</p>
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<p>Week 11 10Nov19</p>	<p>DRFT9106 – Lecture 10</p> <p>In class assignment</p> <hr/> <p>Announced one week in advance.</p> <p>Assignment should challenge the student to apply current Acad and AutoCAD Electrical Knowledge to insert another drawing into same sample set from previous weeks and also the same as per the homework.</p> <p>The goal is to now create an output card to drive the lights designed into the panel the Students should already be working on.</p> <p>Old material (revisit):</p> <ul style="list-style-type: none"> • Create a card • Create page and document data for use in the title block • Use the correct page to generate required referencing <p>New Material:</p> <ul style="list-style-type: none"> • As per the class lecture and demonstration, the students must correctly insert the output card and format accordingly. • Lights attached to the Output Card must be Green and Amber for Returned and Advanced <p>Note: Assigned returned indicate there must be some discussion regarding standard panel designs criteria (ie: Pushbutton and Light Layouts)</p> <p>Editing Demo02.dwg and Demo05.dwg in class.</p>	<p>None - tutorial</p>	<p>Assignment 9</p> <p>(hand in the drawing completed during the tutorial session via Blackboard)</p>
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<p>Week 12 17Nov19</p>	<p>DRFT9106 – Lecture 11</p> <p>Scanning Technologies</p> <hr/> <p>Lesson explores the two major methods used to import previous paper copies of drawings into AutoCAD Format for editing / storage purposes.</p> <ol style="list-style-type: none"> 1. Scanning and Conversion 2. Tracing <p>Use current drawings and export in multiple formats to simulate a scanned drawing. Simulated files are then run through conversion software and examined for content and accuracy.</p> <p>What is the purpose of moving from hardcopy to Electronic Format?</p> <ul style="list-style-type: none"> ○ Archiving ○ Disaster recovery ○ Future or current editing / updates to drawings <p>The reason will determine if the scanned copy needs to be converted directly into Acad or just store electronically (ie: high resolution jpg or pdf)</p> <ol style="list-style-type: none"> 1. Using several files, discuss Raster and Vector formats and demonstrate how to convert using conversion software. (SCAN2CAD seems to be good for this ... download and use as 14 day free trial). 2. Example of using in imported file and attempting to trace. File should be low quality to justify tracing. <p>Lesson slide contains more information on each of the methods shown here.</p>	<p>Slides 1 – 26</p> <p>Tutorial</p>	<p>Assignment</p> <p>(Students are told they will most likely have to create a drawing by tracing as part of the exam or future exercise – post the example used in class for practice).</p>
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<p>Week 13 24Nov19</p>	<p>DRFT9106 – Lecture 12</p> <p>Behind the Scenes in AutoCAD Drawing Electronic Circuit with TinyCAD</p> <hr/> <p>Lesson to look at some “behind the scenes” aspect of AutoCAD Electrical. This includes showing where and how AutoCAD stores the information it uses to Create and Track Projects, Settings, Drawing Locations, Title Block information and more. Basically follows an article posted by AutoDesk regarding Tips and Trick.</p> <p>The goal is to give the students better understanding of where information is located and how they may be asked to use AutoCAD Electrical by an Employer who creates and / or edits hundreds or thousands of drawings.</p> <p>Emphasis is on being able to edit the title block across many drawings at the same time.</p> <p>*****</p> <p>Since AutoCAD Electrical does not come standard with a good Electronic Library, Students are asked to Download and Install TinyCAD and are give 3 examples of work. The task is the use an unknown program and recreate at least one of the circuits. By this time, a good understanding of how drawing software works will help them navigate the software and apply basic principles such as Copy-Paste, Grid, Snap, Text Editing, Property Editing, etc.</p> <p>AutoCAD is not the only software being used and exposure to this simple “shareware” program is a good segue into more detailed discussion.</p> <p>Working with TinyCAD should also provide a break in the course and make the class a bit more fun and less pressure. Choose TinyCAD since it is not well-known and there is a good chance that Students have not used this package previously.</p>	<p>Tutorial – Students to follow.</p>	<p>In Class Assignment/Assessment</p> <p>(Observe and Review each Student’s progress as they work through using a new piece of software)</p> <p>Grade is Pass/Fail. Student receive 10 of 10 as long as they attempted to use the software, asked questions when needed and were able to demonstrate some proficiency and understanding the required task.</p>
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<p>Week 14 1Dec19</p>	<p>DRFT9106 – Lecture 13 Class and Exam Review Session</p>	<p>Summary Sides</p>	<p>Assignment – Practise what has been learned in class for the exam</p>
	<p>Allow Student to practice before the exam:</p> <p>Should focus on providing some example exam drawings which include many of the elements discussed in class.</p> <p>Tracing a drawing would be the focus as that has been the homework assigned.</p>		

Week 15 8Dec19	DRFT9106 – Lecture 14		
	Final Exam		

Ideas for 2020:

- Factory Utilities
- Applying Scan Data
- Specification Sheets
- Purchasing Part List
- Digital Installation Package (R,F,P)
- More assignments leading up to Final Exam to better prepare students
- Quiz in the second ½ of the semester to better prepare students for Final Exam.