

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.

TLP:

Week	Topic	PowerPoint	Homework / Tests
1	Introduction and Lecture 2 – Drawing Introduction, Layers, Object Snap, Basic Drawing Techniques	Intro: 1 to 15 Lesson #1: 1 to 38	Email Assignment - Due in one week Assignment 1 - Due in one week
2	Lecture 2 (Continued)	Slides: 1 to 38 (Continued)	Assignment 2 – Due in one week
3	Lecture 3 – Drawing Precision, Files Types, Templates, Tools	Slides: 1 to 15	In Class Practice and Take-home. Assignment 3 – Due in one week
4	Lecture 4 – Quiz (60min), Drawing Arc, Breaking Lines, Viewing, Navigation.	Slides: 1 to 13	Assignment 4 – Quiz due in class.
5	Lecture 5 – Basic Panel Design, Power Circuits, Examples.	Slides: 1 to 23	Assignment 5 - Review handouts from class, the preps students for the next week when ACAD Electrical is Started.
6	Lecture 6 – Introduction to Working with Project Manager – Setting Properties.	None – Tutorial on Screen	Assignment 6 - Hand in the drawing completed during the tutorial session via Blackboard.
7	Lecture 7 (EXAM)		
8	Reading Week		

TLP (Con't)

Week	Topic	PowerPoint	Homework / Tests
9	Lecture 8 - Review of exam result and the most common errors. Begin to practice report generation and dive into Acade Projects.	None – Tutorial on Screen	Assignment 7 - Hand in the drawing completed during the tutorial session via Blackboard.
10	Lecture 8 – Continue with Tutorial		<p>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>
11	Lecture 10 - In class assignment	None - tutorial	Assignment 9 - Hand in the drawing completed during the tutorial session via Blackboard)
12	Lecture 11 - Scanning Technologies	Slides 1 – 26 Tutorial	Assignment - 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.
13	Lecture 12 - Behind the Scenes in AutoCAD Drawing Electronic Circuit with TinyCAD	Tutorial to Follow	<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>
14	Lecture 13 Class and Exam Review Session	Summary Sides	Assignment – Practise what has been learned in class for the exam
15	Final Exam		

Lab Rubric explanation:

Lab Performance: (Possible Deductions From Your Overall Lab Score)

Late:	Arriving 5 minutes or more receives a penalty mark of (-1)
Missing the lab period:	A penalty mark of (-3)
Prelab:	Failing to present the pre-lab during signing will result in a (-4) penalty.
Due Date:	Labs are due one week after the scheduled lab. Late labs will be given a penalty of (-3). Labs submitted more than one week late receive <u>zero (0)</u> value.

Lab Evaluation:

Content:

This is the evaluation of calculations, measurements, accuracy and relevancy of data. Graphs must be complete and details with axis values. Code is provided with comments.

Analysis:

This is the evaluation of the validity of the long answers provided to explain the solution to lab questions. Questions are original and fully answered correctly.

Presentation:

This is the neatness of the lab; inclusion of all correct units; correct graphical displays; grammar; spelling. Good use of external references.

Lab Attendance:

Students will be placed on course condition if two or more labs are missed. Missing additional labs will result in expulsion from the course. Students will receive formal Niagara College course condition email and notification from the department office.

OUTCOMES AND LEARNING OBJECTIVES:

Upon successful completion of this course, the student has reliably demonstrated the ability to:

1. Properly utilize AutoCAD Electrical and its fundamental applications
2. Properly utilize Inventor capabilities in wire harness and work cell layout/designs
3. Analyze and explain an implementation package for a digital manufacturing space.
4. Analyze the various types of barrier guards employed on industrial machinery.
5. Analyze industrial robot safety and applications.

Learning Objectives:

1. Demonstrate the ability to create proper electrical documentation
 2. Demonstrate the ability to create panel layouts
 3. Demonstrate the ability to create a schematic design
 4. Demonstrate the ability to create a control design
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1. Demonstrate the ability to integrate electrical schematics into an electromechanical design
 2. Create an integrated work cell with robotics to improve production using scan data and factory utilities
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1. Properly create a spec sheet for purchasing for a control systems
 2. Create a parts list for purchasing of an automation solution
 3. Create a digital installation package
 4. Create the technical and digital data to support a request for proposal.
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1. Explain the use of fixed and removable barriers.
 2. Analyze the use of light curtain barriers and perform safe distance calculations.
 3. Explain the functions and applications of safety mats.
 4. Explain the functions and applications of foot pedals and hold-to-run controls hardware.
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1. Explain the general safety requirements of industrial robots and robot systems.
 2. Describe the various guarding methods for industrial robots.
 3. Describe the robotic safeguarding devices used and the performance requirements of these safeguarding devices.
 4. Identify the installation requirements for robots and robotic systems.
 5. Identify the safeguarding requirements of personnel that are required to interact with robots and robotic systems.
 6. Describe the testing and startup procedures for robots and robotic systems.
 7. Describe the maintenance procedures for robots and robotic systems.