Flip Lab and Classroom with Assessments

Presented by

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Description: We have been very successful in running an open lab with multiple courses, no lectures in our Mechatronics program. After much refinement, we think this model and system can greatly improve the outcomes, reduce busywork of grading, and still provide value and true learning and assessment. You'll see examples of this applied to our Mechatronics work in PLCs, Hydraulics, Pneumatics, and Industrial Electrical course to name a few. We offer our content to share with you or ideas to reshape what you do to increase outcomes.

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Problem: Efficiency and Effectiveness

- Grading in general
- Grading after the work was done?
  - When do they repeat and when do we repeat?
- Measuring skill (application) versus lower Blooms levels
- When is the point of feedback for the learner?
  - As time passes what is the value of feedback?

How do we teach multiple courses/sections at one time

3

- We don’t lecture – eLearning and reading focused material
  - Off loading the grading to hands on assessment.
  - Layered approach of learning
  - Something basic, then add this and build on scaffolding to learn further.

The outcome of this…

- When the student is doing the applied skill / task that is when YOU the instructor are most engaged.
- Answer their questions and not the ones we think they have.
- We adjust rapidly to what the student needs or application.
- Sense of accomplishment that the task was done right or they now know.

Finding & Creating Content

- eLearning sources.
- Textbook focused readings page…to page
  - Specific worksheet
- Buy when possible, don’t build.
- Create own with screen recording

Work Order Planner

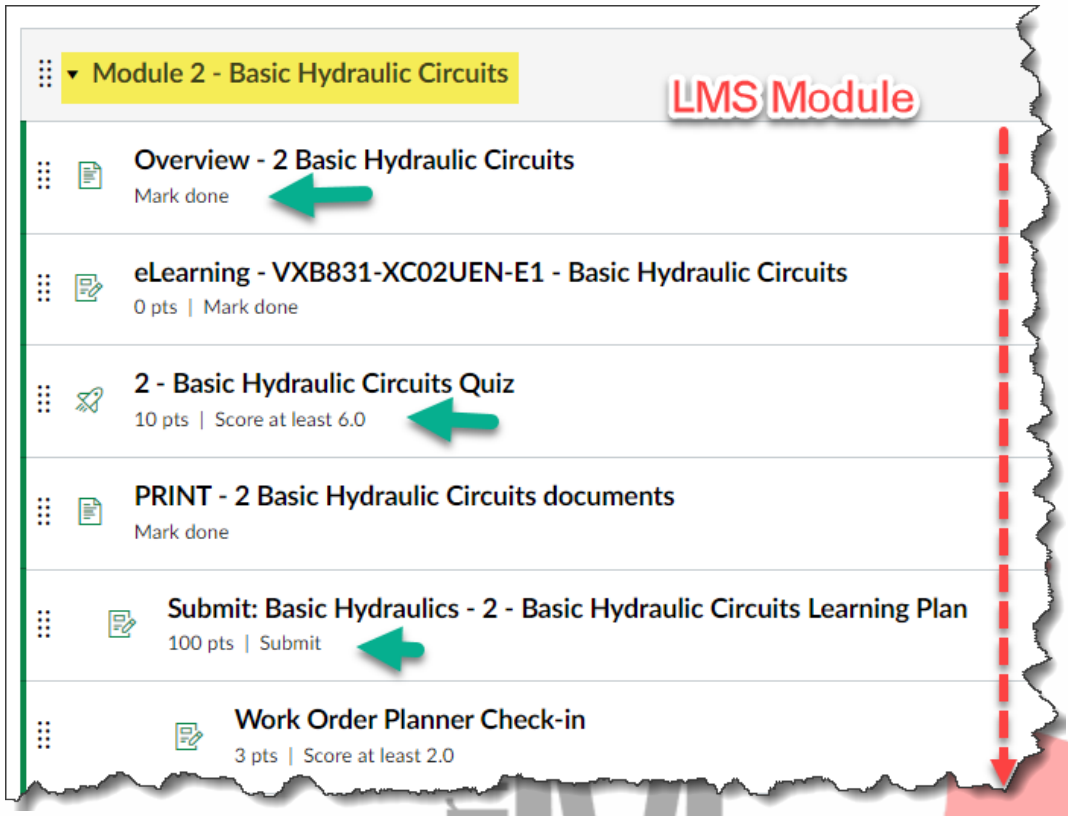
- Students have a work order planer
  - States what needs to be done each week, when is their call (within class times)
  - Google Doc that instructor / student can edit

Student Name - Mechatronics Full Time Work Order Planner

Sem Days	Course #	Course title - cr/hrs/wek	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
	Dates	*Edit Week 1 & Week 9 dates as to match your dates.*	*1/24/22*	*1/31/22*	*2/7/22*	*2/14/22*	*2/21/22*	*2/28/22*
1	**419-116**	**Basic Hydraulics 2cr/4hr.**	Module 1		Module 2		Module 3	
1	419-117	Basic Pneumatics 2cr/4hr.		Module 1		Module 2		Module 3
1	**462-111**	**Mechanical Concepts 2cr/4hr.**	Module 1	Module 2 skills 1-5	Module 2 skills 6-9	Module 3	Module 4	Module 5 skills 1-5
1	462-119	Industrial Mechanical Skill 2cr/4hr.	Module 1.1 - 1.2	Module 1.3,1.4	Module 2.1 - 2.4	Module 2.5 - 3.2	Module 3.3 - 3.6	Module 4.1 - 4.2
1	462-115	Industrial PC Network Concepts 2cr/4hr.	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6
1	**462-130**	**Mfg. Prints & Networks 1cr./2hr.**	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6
1	625-180	Mfg. Skill Standards 2cr/4hr.	Module 1		Module 2	Module 3	Module 4	Module 5
	Use the rows below to track your progress in either the Related Welding or the Customer Course option. Welding i							

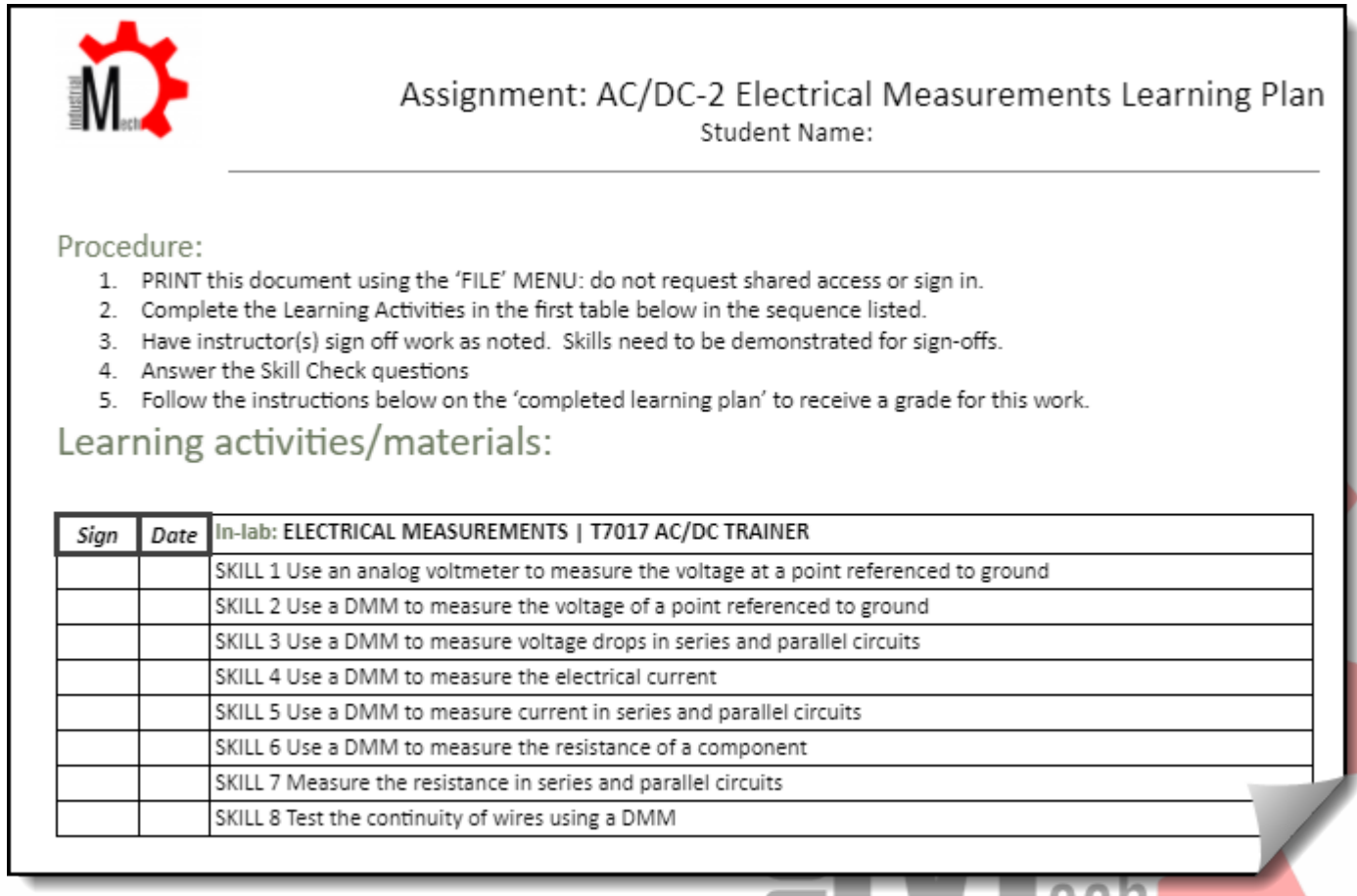
LMS Controls the flow of information.

- LMS has each module identified for every course
  - eLearning
  - Quiz
  - Print activities (must do the above to print)
    - Learning Plan (the sign off sheet) or Lab
    - Lab activity .pdf from vendor our Google Doc



Learning Plans guide what to do

- Each ‘Skill’ is identified and required
  - Separate lab instructions explain the steps.
- Each Skill requires a sign-off where Formative assessment is done.



Assignment: AC/DC-2 Electrical Measurements Learning Plan

Student Name:

Procedure:

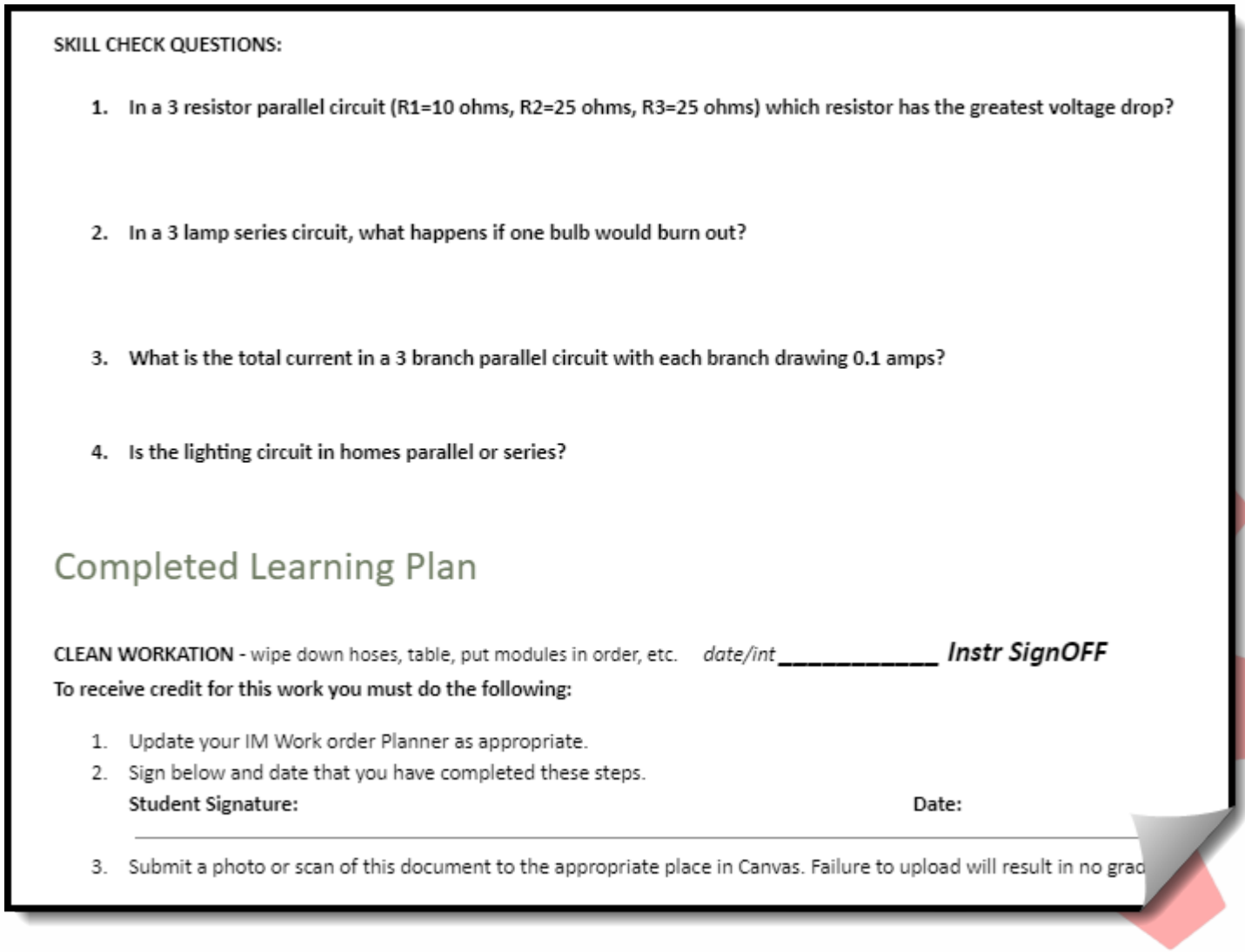
1. PRINT this document using the ‘FILE’ MENU: do not request shared access or sign in.
2. Complete the Learning Activities in the first table below in the sequence listed.
3. Have instructor(s) sign off work as noted. Skills need to be demonstrated for sign-offs.
4. Answer the Skill Check questions
5. Follow the instructions below on the ‘completed learning plan’ to receive a grade for this work.

Learning activities/materials:

Sign	Date	In-lab: ELECTRICAL MEASUREMENTS | T7017 AC/DC TRAINER
		SKILL 1 Use an analog voltmeter to measure the voltage at a point referenced to ground
		SKILL 2 Use a DMM to measure the voltage of a point referenced to ground
		SKILL 3 Use a DMM to measure voltage drops in series and parallel circuits
		SKILL 4 Use a DMM to measure the electrical current
		SKILL 5 Use a DMM to measure current in series and parallel circuits
		SKILL 6 Use a DMM to measure the resistance of a component
		SKILL 7 Measure the resistance in series and parallel circuits
		SKILL 8 Test the continuity of wires using a DMM

Learning Plans completion

- Review questions
- Verify all tasks are complete
- This then completes the grading.
- If missing things, no final sign off until completed.



SKILL CHECK QUESTIONS:

1. In a 3 resistor parallel circuit (R1=10 ohms, R2=25 ohms, R3=25 ohms) which resistor has the greatest voltage drop?

2. In a 3 lamp series circuit, what happens if one bulb would burn out?

3. What is the total current in a 3 branch parallel circuit with each branch drawing 0.1 amps?

4. Is the lighting circuit in homes parallel or series?

Completed Learning Plan

CLEAN WORKATION - wipe down hoses, table, put modules in order, etc. *date/int* _____ ***Instr SignOFF***

To receive credit for this work you must do the following:

1. Update your IM Work order Planner as appropriate.
2. Sign below and date that you have completed these steps.
   Student Signature: **Date:**
3. Submit a photo or scan of this document to the appropriate place in Canvas. Failure to upload will result in no grad

Example Skill / Learning plan combined

- Lists the steps and procedure
- Provides stop points for instructor review
  - Feedback on any errors

Finding Opens with an Ohmmeter:

With the switches closed, predict the Ohmmeter readings between the following points:

With I disconnected, I & K = _____Ohms
With E disconnected, E & K =_____Ohms
With C disconnected, C & K = _____Ohms
With D disconnected, D & K = _____Ohms

Verify the above is complete with sign off - *date/int* _____ ***Instr SignOFF***

1.1 Lighting Control Learning Plan

Objective:
In this unit, you will learn the basic parts of a PLC program.

Procedure:
1. Complete the Learning activities, Demonstrate to your instructor and Complete the Lab Procedure & Sign off and submit.

PART 1: Planning a PLC Project - Case Study - Light Control
Whenever something is built it starts with a plan. Here are the steps we will use to create a PLC Project to solve a problem or perform a task.

Steps in this process:

1. PROJECT TITLE: Define what it is.
2. State the SOP - Sequence of Operations
3. Define the inputs/outputs and assign the nicknames/tags
4. Create the PLC program (often on paper first)
5. Test our program
6. Modify until the SOP requirement is met.

1. Project Title: A refrigerator light

2. SOP: The system will turn ON the Entry Light when the Entry Light Switch is in the UP position. When the user puts the Entry Light Switch in the Down position the Entry Light will be turned OFF.

3. Define the inputs/outputs and assign the nicknames/tags

Device Nickname	Type of device	PLC address	Operation/comment
Entry Door Switch	2-position UP / DOWN switch	X1	ON =Switch is upward OFF=Switch is downward
Entry Light	Light Bulb for the interior of the fridge	Y1	ON=Light is lite OFF=Light is dark

Warning…Shameless Plug coming..

- Our open lab
- 1 – lab
- Multiple course (18)
- 3 shifts
- And mirrored for 1 shift in Menomonie

Mechatronics – Specialist / Technician

def: Mechanics, Electronics, and other stuff working together previously called the Industrial Mechanics program.

- This program prepares you earn a great living
  - Like solving problems
  - Like making things better
  - Being valued
  - Having skills you can use for a lifetime
- Maintain and repair things in
  - Manufactures
  - Facility Maintenance
  - Weld, hammer, push things around and get paid! ☺
  - Troubleshoot equipment and maintain

industrial Mech

What you'll learn

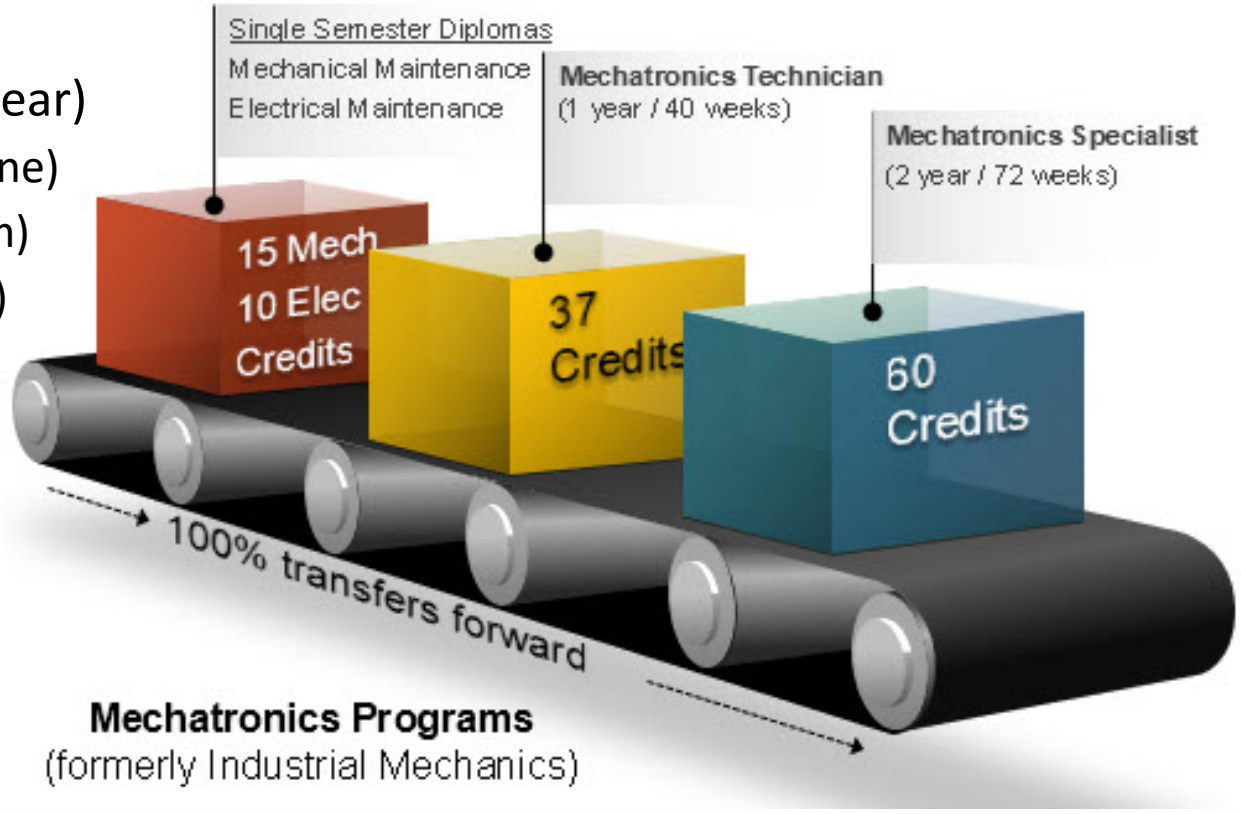
- How to troubleshoot systems and minimize failures in
- Mechanical Systems
  - Learn the right way and safe way to work on systems.
- Pumping systems
  - Used in food and processing,
- Electrical Systems
  - Controlling manufacturing lines
  - Industrial computers called PLC's / HMI
  - 3 Phase motors, Conveyors, Robots
- Hydraulic and Pneumatic
- Learn to read their language and think like these devices

Flexible scheduling

- We offer true flexibility for people working days, nights, etc.
- Days, Afternoons and Evenings
- 4 programs laddered within
  - Mechatronics Specialist 2-16-week blocks (2 year)
    - Mechatronics Technician 8 weeks* (1 year alone)
      - Mechanical Maintenance 16 weeks (1 sem)
      - Electrical Maintenance - 16 weeks (1 sem)
- All classes start every 8 weeks

in our Stacked Lab

  - Jan, Mar, Jun, Aug, Oct
  - Operating from 7-10pm; Mon-Friday



THREE SHIFTS - 5 STARTS / YEAR

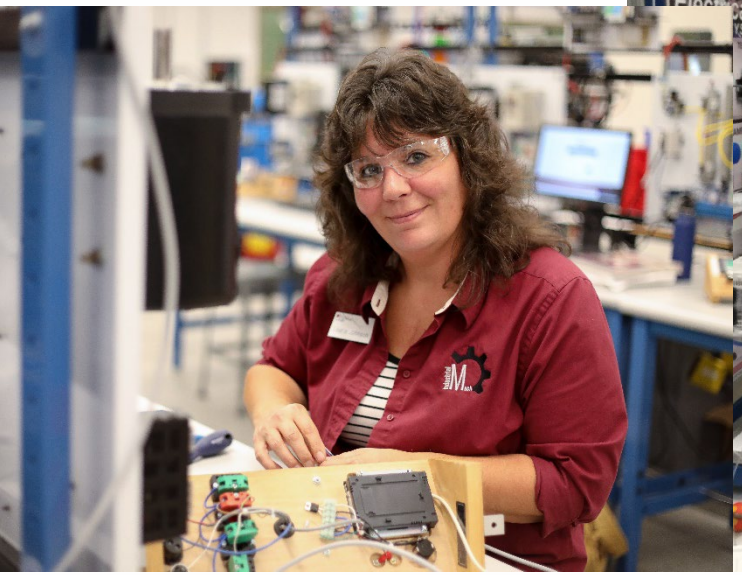
	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY	
8:00 AM										
9	1st		1st		1st		1st		1st	
10	Shift		Shift		Shift		Shift		Shift	
11										
NOON			1st				1st		1st	
1	1st	2nd	Shift	2nd	1st	2nd	Shift	2nd	Shift	2nd
2	Shift	Shift		Shift	Shift	Shift		Shift		Shift
3										
4:00 PM										
5	3rd		3rd		3rd		3rd			
6	Shift		Shift		Shift		Shift			
7										
9										

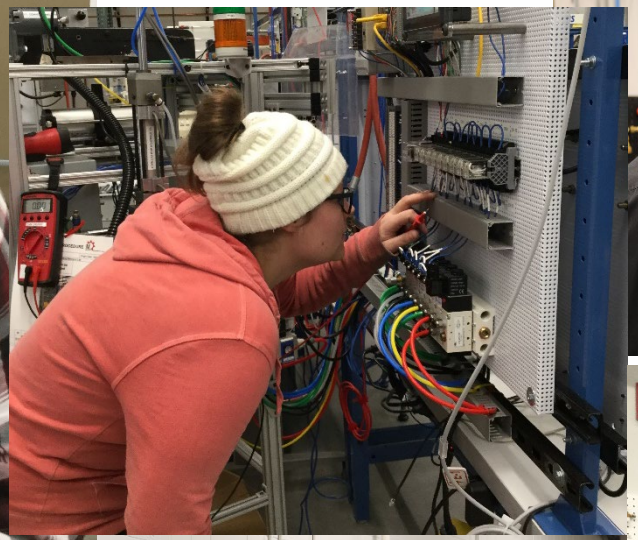
THREE SHIFTS

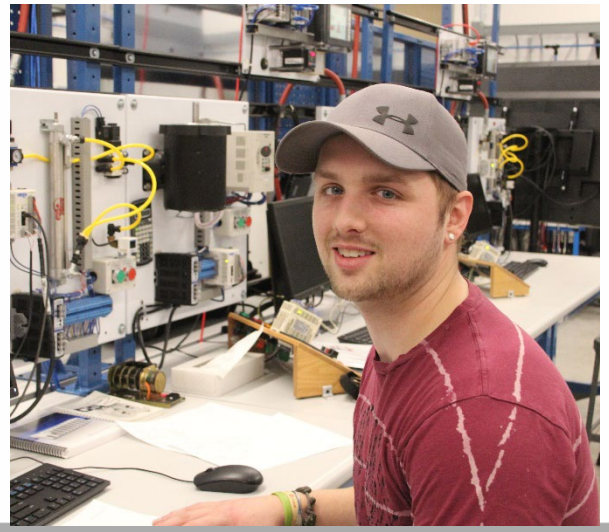
- 7AM – FULL TIME DAYS
- NOON-4PM MONDY – FRIDAY
- 5PM – 10PM MONDAY – THUR

- **STARTS EVERY 8 WEEKS**
  - January
  - March
  - June
  - August
  - October

Typical Students… ☺ All ages



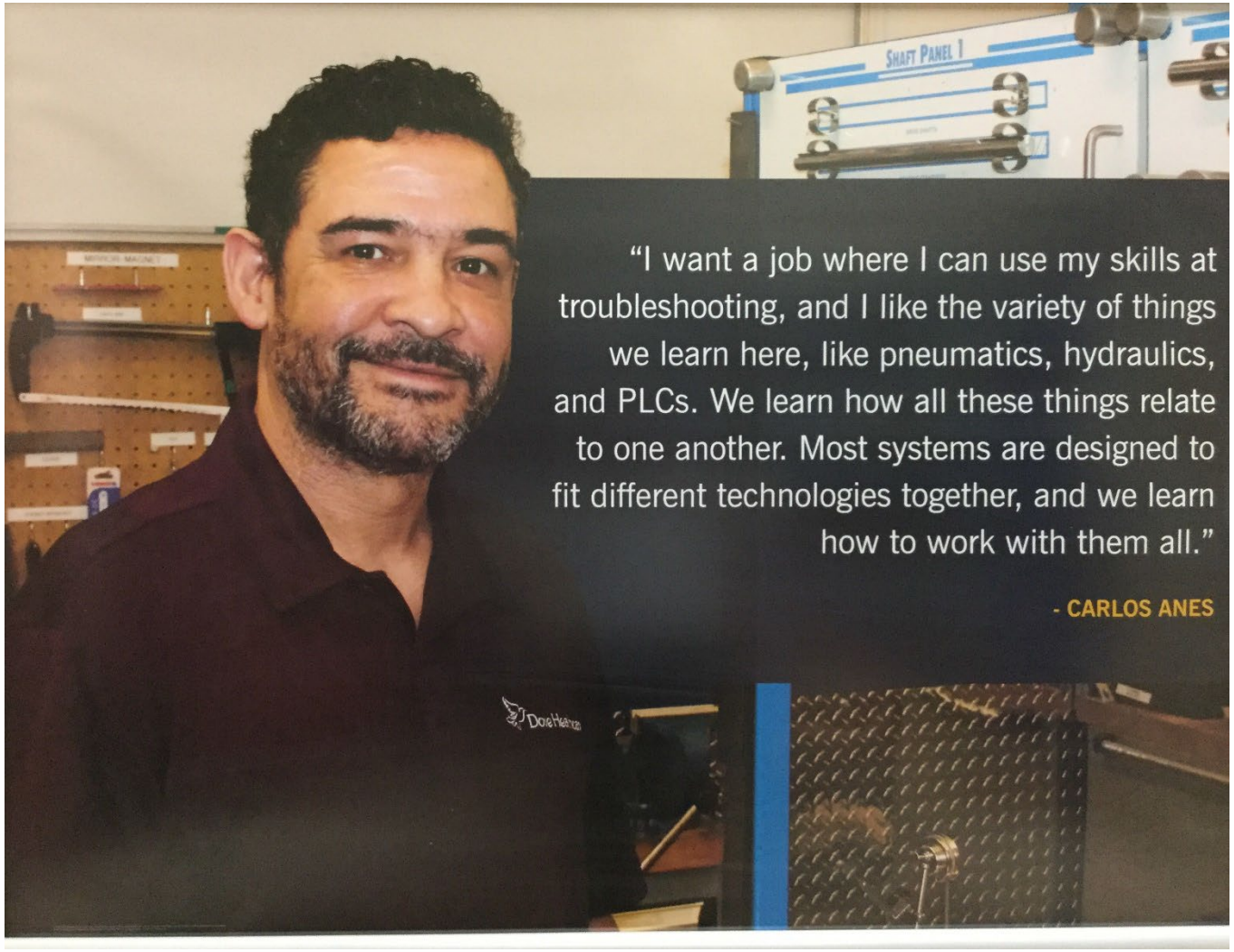




Student Spotlights

- **Louria Johnson – evening student**

Student Spotlights



- **Carlos Anes**
  - **Full time Days**
  - **Afternoon**
  - **Evening**
- **Life Happens!**

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Lab Tour: Let's go!

- **2 locations**
- Eau Claire at our Applied Tech Center (Gateway Campus)
- Menomonie Campus

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