Program: Industrial Maintenance Technology		*Course to Program Map*					
Program Outcomes: Upon completion of the program, graduates will be able to…	Institutional Skills	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
Courses							
INPR 131 - Shop Operations / OSHA-10	CPW	IRA	IRA	RA			
INPR 101 - AC/DC Circuits	CPW	RA	IRA		IRA		IRA
MATH 107T - Math for Tech	CPW		IA		IRA	IA	
INPR 132 - Electro-Mechanical Print Reading and Wiring	CPW	IRA			IRA	IA	IRA
COMM-103 Interpersonal Communications	CPW	IR					
INPR 231 - Motor Controls 1	CPW	IA	IA		IRMA		I
INPR 232 - Motor Controls 2	CPW	RA			IRMA		
INPR 134 - Mechanical Systems	CPW	RA	IRMA	IRMA		IRMA	
INPR 255 - Mechanical Systems Reliability	CPW	RMA	IRMA	IRMA		IRMA	
INPR 160 - Fluid Power I	CPW	RA		IRA		IRMA	
INPR 170 - Fluid Power II	CPW	RA		IRA		IRA	
INPR 190 - Programmable Logic Controllers (PLC)	CPW	RA	IA		RA		IRA
INPR 100 - Industrial Process Control	CPW		RA				IRA
INPR 122 - Intro to Manufacturing Welding	CPW	IA	IA				

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

Essential Skills	
1	written communication
2	oral communication
3	critical thinking
4	cultural diversity
5	social responsibility

Employability Skills	
C	communication
P	problem solving
W	work ethic

INPR 122 INTRO TO MANUFACTURING WELDING

Curriculum Map

Course SLO: Students will be able to	Program Outcomes: perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair electrical systems
Demonstrate safe work practices.	IRA					
Demonstrate skills to safely operate basic welding and cutting equipment.	IA	IA				
Identify materials (aluminum, cast iron, mild steel, etc.) and proper tools and processes to repair.	IA					
Properly use an oxy-acetylene torch in heating and cutting operations.	IA	IA				
Demonstrate proper use of plasma cutting systems.	IA	IA				
Demonstrate proper use of MIG, TIG, and Stick welding systems.	IA	IA				
Perform basic diagnostic and maintenance operations on welding and related equipment.	IA	IA				

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

INPR 131 Shop Operations/OHSA10

Curriculum Map

Program Outcomes Course SLO: Students will be able to	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
Understand the various career paths within the industry and the importance of basic employability skills and professional conduct.	I					
Recognize jobsite hazards and how to prevent/mitigate them.	RA	IRA				
Explain the importance of OSHA in providing a safe and healthful workplace to workers.	IR					
Identify appropriate personal protective equipment (PPE) for common industry hazards.	IRA					
Explain and perform lockout tagout (LOTO) procedures.	IRA	IRA				
Understand maintenance methods and the importance of maintenance record keeping.	IR					
Identify and explain the proper use of various tools used in the industry.	IRA					
Identify various fastener types and their uses.	IA					
Understand basic troubleshooting principles and the root cause analysis procedure.	IRA			IR	IR	IR
Identify and describe various types of rigging slings, hardware, and equipment.	URA	IR				

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

INPR 101 AC/DC Circuits

Program Outcomes	*Curriculum Map*					
Course SLO: Students will be able to	**perform all work safely**	**set up and operate equipment and systems to ensure reliable performance**	**research preventative and predictive maintenance techniques**	**troubleshoot and repair electrical systems**	**troubleshoot and repair mechanical systems**	**troubleshoot and repair automated systems**
Describe and apply Ohms, Watts, and Kirchoff laws.	**IRA**					
Define, demonstrate, and apply the characteristics of series, parallel, and combination circuits.	**IRA**					
Explain DC theory concepts.	**IRA**					
Explain AC theory concepts.	**IRA**					
Perform and interpret electrical measurements using industry standard equipment.	**IRA**	**IRA**		**IRA**		
Read and interpret electrical symbols and schematics.	**IRA**			**IR**		
Troubleshoot basic AC and DC circuits.	**IRA**	**IRA**		**IRA**		

Mapping	
I	**Introduced**
R	**Reinforced**
M	**Mastered**
A	**Assessed/Artifact**

INPR 132 Electro-Mechanical Print Reading and Wiring

Curriculum Map

Program Outcomes Course SLO: Students will be able to	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
Demonstrate understanding the differences between each type of electrical diagram.	IRA			IR		IR
Explain how various electrical diagrams are used to depict the operation of a control circuit and how they are used to troubleshoot a circuit.	IRA			IRA		IRA
Demonstrate accurate labeling of a ladder diagram using the four basic number systems and including the proper device symbols for control devices, loads, and overcurrent protection devices.	IRA			IRA		IRA
Interpret control logic ladder diagrams and accurately explain the control narrative for the circuit/s depicted.	IRA			IA		IA
Interpret a control narrative and draw an accurate ladder diagram for the circuit/s explained.	IRA					
Explain the significance of the National Electrical Code (NEC) and what role it plays.	IR					
Demonstrate the use of the National Electrical Code (NEC) for conductor sizing (Article 310.15), overcurrent protection (Article 240.4), grounding (Article 250), and color coding (Article 200.4, 200.6).	IRA					
Demonstrate proper wire termination on terminals strips, device terminals, and electric motors.	IRA	IRA		IRA		IRA

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

MATH 107T Math for Tech

Curriculum Map

Program Outcomes	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
Course SLO: Students will be able to						
factor quadratic expressions, expressions of quadratic form, special forms, and factor by grouping						
perform addition, subtraction, multiplication, and division on rational expressions				RA		
simplify complex fractions.						
apply the laws of exponents to simplify expressions containing rational exponents		IA			IA	
apply the laws of radicals to perform addition, subtraction, and multiplication on expressions involving radicals. Rationalize denominators containing radicals				IA	IA	
simplify radicals containing negative radicands. Perform arithmetic operations on complex numbers						
evaluate functions using function notation						
solve linear inequalities in one variable showing solutions both on the real number line and in interval notation						
solve literal equations, including those that require factoring.						
solve systems of linear equations in two variables						
solve equations by factoring and quadratic formula.						
solve equations containing rational expressions				IA	IA	
solve equations involving radicals.						
solve linear absolute value equations and inequalities in one variable						
develop and solve mathematical models including variation, mixture, motion, work, and geometrical applications					IA	
graph quadratic functions.						
find an equation of a line given either sufficient information (two points) or a particular condition (perpendicular to a given line, parallel to a given line through a specific point, through a specific point with						
calculate the distance between two points.					IA	
distinguish between functions and relations using the Vertical Line Test						
find the domain and range of a function given its graph.						
find missing angles of polygons.						
solve right triangles.					IA	
use Pythagorean Theorem to solve application problems.					IA	
find the areas of common geometric shapes: Quadrilaterals, Circles Triangles etc					IA	
find length of arcs and associate angles.						
use trigonometric ratios to solve problem.					IA	
finding trigonometric values and angles using a calculator					IA	
represent data by bar charts.						
represent data by Pie charts.						
find linear regression that models a data.						
find measures of central tendency.						
find measures of dispersion.						
find profit and loss						
estimate simple and compound interest						
solve problem using the discount, depreciation and commission						
find the probability of an event.						

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

INPR 231 Motor Controls 1

Program Outcomes	*Curriculum Map*					
	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
Course SLO: Students will be able to						
Identify, read, interpret, and label control circuitry ladder diagrams.				RAM		
Draw control circuit ladder diagrams using the proper symbology from a functional circuit description.				RAM		
Identify and describe the functional characteristics of mechanical input control devices.				IRA		
Identify and explain the function characteristics of a solenoid.	IRA	IA		IRA		
Explain the functional characteristics of electromechanical relays, contactors, and motor starters.	IRA	IA		IRA		
Describe semiconductor devices used for input devices, amplification and switching, powerswitching.	IRA			IRA		
Identify and explain the functional characteristics of photo electric devices, fiber optics, and light-based controls.	IRA			IRA		
Explain the operation and function of solid-state relays and starters.	IR			IR		

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

INPR 232 Motor Controls 2

Curriculum Map

Program Outcomes	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
Course SLO:						
Identify and explain the different types of				IA		
Identify and explain DC and				RA		
Troubleshoot	IRA			IRA		
Identify and describe the different types of				IA		
Identify and describe the				IA		
Explain the concept of reduced voltage				IA		
List and describe basic drive	IRA			IRA		
Identify, and explain the functional	RA			IRA		
Explain the fundamentals of				IRA		
Explain the purpose and				IRA		
Troubleshoot electric motor	IRA	IRA		IRA		
Perform basic motor drive start-	IRA	IRA		IRA		
How to properly select the correct	IRA			IRA		

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

Mechanical

Curriculum Map

Program Outcomes	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
Students will be						
identify shaft size using precision	**RA**	**IRA**	**IRA**		**IRA**	
demonstrate shaft alignment using a flexible jaw	**RA**	**IRA**	**IRA**		**IRA**	
select, measure, and install a key fastener	**RA**	**IRA**	**IRA**		**IRA**	
demonstrate shaft alignment skills necessary to install chain, grid, and gear	**RA**	**IRA**	**IRA**		**IRA**	
demonstrate selection,	**RA**	**IRA**	**IRA**		**IRA**	
calculate sprocket ratio, shaft speed,	**RA**	**IRA**	**IRA**		**IRA**	
demonstrate installation and alignment of a chain drive system to include the use of	**RA**	**IRA**	**IRA**		**IRA**	
calculate pulley ratio, shaft speed,	**RA**	**IRA**	**IRA**		**IRA**	
demonstrate installation and alignment of a v-	**RA**	**IRA**	**IRA**		**IRA**	
demonstrate installation and alignment of spur	**RA**	**IRA**	**IRA**		**IRA**	
identify, specify, and select v-belts and their drive components.	**RA**	**IRA**	**IRA**		**IRA**	
explain the purpose and application of			**IA**		**IA**	

Mapping	
I	**Introduced**
R	**Reinforced**
M	**Mastered**
A	**Assessed/Artifact**

INPR 255 Mechanical Systems Reliability

Program Outcomes / Course SLO: Students will be able to	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
	Curriculum Map					
identify various types of plain bearings and their applications, installation and maintenance.			IRA		IRA	
demonstrate how to install, maintain, and specify plain and anti-friction bearings.	RA	IRA	IRA		IRA	
demonstrate selection, maintenance, and troubleshooting of a variety of couplings.	RA	RA	RA		RA	
calculate gear ratio, shaft speed, and torque of a gear drive system.					IRA	
select and identify gears for a given application.					IRA	
explain laser shaft alignment principles and operation.			IA		IRA	
demonstrate vertical parallel and vertical angular alignment.	RA		IRA		IRA	
demonstrate horizontal parallel and horizontal angular alignment.	RA		IRA		IRA	
explain vibration concepts, resonant frequency and sympathetic vibration.			IA		IRA	
demonstrate velocity, acceleration and spike energy measurement with vibration meter.	RA		RA		RA	

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

COMM-103 Interpersonal Communicatoins

	Curriculum Map					
Program Outcomes	**perform all work safely**	**set up and operate equipment and systems to ensure reliable performance**	**research preventative and predictive maintenance techniques**	**troubleshoot and repair electrical systems**	**troubleshoot and repair mechanical systems**	**troubleshoot and repair automated systems**
Course SLO: Students will be able to						
Demonstrate an ability to apply effective communication techniques within a variety of contexts.	**IR**					
Demonstrate an understanding of various effective conflict management skills.	**IR**					
Demonstrate an understanding of the impact of gender and culture on interpersonal communication.	**IR**					
Demonstrate an ability to analyze effective listening habits and skills.	**IR**					
Evaluate the role of verbal and nonverbal messages in interpersonal communication.	**IR**					
Recognize the role of perception of self and others in interpersonal communication.	**IR**					

Mapping	
I	**Introduced**
R	**Reinforced**
M	**Mastered**
A	**Assessed/Artifact**

INPR 160 Fluid Power I

Program Outcomes / Course SLO: Students will be able to	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
	Curriculum Map					
Explain the differences between a positive displacement pump and a nonpositive displacement pump.					IRA	
Describe the purpose of common components used in piping systems and how to properly install those components.					IRA	
Identify and explain common forms and application of different types of piping and tubing.					IRA	
Identify and describe the most common hand tools used in assembling piping systems.					IRA	
How to cut and thread pipe using power tools and threading machines.	IRA	IRA			IRA	
Discuss common threading systems used in piping systems and their differences.					IRA	
Identify and discuss various ways in which piping connections are made.					IRA	

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

INPR 170 Fluid Power II

Program Outcomes	*Curriculum Map*					
Course SLO: Students will be able to	**perform all work safely**	**set up and operate equipment and systems to ensure reliable performance**	**research preventative and predictive maintenance techniques**	**troubleshoot and repair electrical systems**	**troubleshoot and repair mechanical systems**	**troubleshoot and repair automated systems**
Define hydraulics and identify terms related to fluid flow.					**IRA**	
Explain the different types of pressure.					**IRA**	
Identify the three basic types of hydraulic diagrams.					**IRA**	
List and describe all the different types of components used in hydraulic systems.	**RA**	**IRA**			**IRA**	
Describe the use of pneumatic systems.					**IRA**	
Identify the properties and characteristics of gas.					**IRA**	
List the gas laws.					**IRA**	
Identify and explain how compression, temperature, moisture, and contaminates affect pneumatic systems.					**IRA**	
List the different types of air compressors and explain the importance of pressure control.					**IRA**	
List and describe all the different types of components used in pneumatic systems.	**RA**	**IRA**			**IRA**	
Identify pneumatic logic.					**IRA**	

Mapping	
I	**Introduced**
R	**Reinforced**
M	**Mastered**
A	**Assessed/Artifact**

INPR 100 - Industrial Process	*Curriculum Map*					
Program Outcomes	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
Course SLO:						
Define the terms "Process" and "Process Variable"						IRA
Identify the four main elements (Primary Element, Measuring Element,						IRA
Describe the difference between						IRA
Explain what a Process Disturbance is and						IRA
Explain how the electrical terms Resistance and Capacitance can						IRA
Explain how Feedback Control and Feedforward Control are accomplished by a						IRA
Explain the ways in which a Controller can be identified (by its power						IRA
Describe the four basic functions of Controllers						IRA
Compare the terms Proportional, Integral and Derivative with the						IRA
Describe what constitutes a Single Element Control						IRA
Explain why the following Control Loops are						IRA
Demonstrate the ability to monitor and troubleshoot a Resistance	IRA	IRA		IRA		IRA

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact

INPR 190 Programmable Logic Controls

Program Outcomes / Course SLO: Students will be able to	perform all work safely	set up and operate equipment and systems to ensure reliable performance	research preventative and predictive maintenance techniques	troubleshoot and repair electrical systems	troubleshoot and repair mechanical systems	troubleshoot and repair automated systems
	Curriculum Map					
Demonstrate safety procedures when working with PLCs.	IRA	IRA				
Connect a PLC to a programming device with proper wiring and terminations of inputs and outputs.	IRA	IRA				
Identify the types, components, and basic operation of a PLC, including the primary function and the various basic components.	IRA					
Identify the numbering systems and symbols used in PLC relay ladder logic.	IRA					
Describe addressing and the function of tags, how PLC module terminals are referenced by tag names, and the application of module-defined tag structures.		IRA				
Describe the purposes of the power supply, input/output (both discrete and analog), processor and programming sections of a PLC, and the function and operation of I/O diagrams and module indicator lights.						
Develop a functional PLC program using appropriate programming languages.		IRA				
Demonstrate the execution of a created PLC program, including monitoring of the PLC operation, and running and stopping a PLC processor file.	IRA	IRA				
Demonstrate the process of PLC system troubleshooting, including I/O sections of a PLC and related field devices.	IRA	IRA		IRA		IRA

Mapping	
I	Introduced
R	Reinforced
M	Mastered
A	Assessed/Artifact