



## ADDENDUM N. 2

### “Industrial Maintenance Training System”

#### TSC RFP 19-24

The following changes are hereby incorporated into the Request for Proposal “Industrial Maintenance Training System” All proposal’s statements submitted for consideration shall be bound by the information contained in this addendum.

#### **\*Item Section and Description**

**Item 1. Exhibit A Pricing Form. There is a correction on part numbers, description and quantity as follows:**

Section 8. Pneumatics Training System, Item#3 on page 20. The quantity added from blank to 4.

Section 9. Hydraulics Training System, Item #2 on page 20. The description changed from T502 to TP601.

Section 13. Advanced Mechatronics Training System, Items #1 and #2 on page 24. The description changed from Advanced Mechatronics System to Modular Production System Industry 4.0 (MPS203 i4.0) and from eSeries Student Curriculum MindSight LMS Web Hosted to Siemens Simatic S7-1512 PLC software with license for fluid engineering, electrical, and logic circuits, however, Items #1 and #2 were combined into one.

See attached revised Pricing Form dated 7/17/19 for more specifications. Please use this revised Pricing Form upon submission of proposal.

#### **Item 2. Question and Answer Session.**

**Question N. 1:** Must the equipment proposed be Festo equipment?

**Answer:** No, as stated in Page 6, under Section 7, Alternate Systems, the potential respondent can provide an equal product of the same/similar characteristics and functionality of FESTO equipment.

7/17/19

**Question N. 2:** Must the equipment be accompanied by eLearning and/or CD ROM Base and/or LMS Web Hosted?

**Answer:** No, as long as there is access to a curriculum.

**Question N. 3:** Is there going to be a full evaluation of any competing training systems and ancillary items such as training and support, troubleshooting capability, E-learning, simulation software, curriculum and lab guides, certifications, etc.?

**Answer:** Please refer to Section 8. Contract Award Process under Evaluation Process on page 7 of RFP.

*“All submitted and qualified proposals will be reviewed, evaluated, and ranked by an evaluation committee. However, as part of the award process, TSC may request interviews or oral presentations from the highest ranked Respondents that are identified in the initial ranking conducted by the evaluation committee”.*

**Question N.4:** Would we have the ability to install the software required for the evaluation and/or bring in equipment for the evaluation committee?

**Answer:** Please refer to Section 8. Contract Award Process under Evaluation Process on page 7 of RFP.

*“All submitted and qualified proposals will be reviewed, evaluated, and ranked by an evaluation committee. However, as part of the award process, TSC may request interviews or oral presentations from the highest ranked Respondents that are identified in the initial ranking conducted by the evaluation committee”.*

**Question N. 5:** Can we get a program of study with course descriptions for the Industrial Maintenance program?

**Answer:** Please see attached Industrial Mechanics and Maintenance Technology degree plan.

Revised Pricing Form  
7/17/19

**Exhibit A**

**PRICING FORM REVISED 7/17/19**

Note: Mark outside of envelope, Proposal For:

**“Industrial Maintenance Training System”  
TSC RFP 19-24**

In submitting this proposal, I agree:

1. To hold price open for a period of ninety (90) days after the opening date.
2. To enter into and execute a Purchase order/contract with the Texas Southmost College, if awarded on the basis of the proposal, and to furnish Bonds if required, in accordance with the owner’s requirements and instructions.
3. To accomplish the work in accordance with the statement of work, description of services, and other terms provided including labor, supplies, and materials necessary.

**Equipment Specifications:**

Multiple Awards: One or more Respondents can be selected for one or more than one trainer or all of the trainers. If the College awards a contract, it will award the contract to the Respondent(s) whose bid proposal (s) is considered to be the most advantageous to College and is determined to be the best qualified.

**1. Mechanical Drives Training System**

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>Mechanical Workstation Basic Package</b> consisting of: – Workstation (SI) – Couplings – Shafts Panel (SI) – Pillow Block Bearings Panel (SI) – Workstation Accessories (SI)	46100-00 46860-00 46861-00 46862-00 46863-00	4	Each	\$	\$
2	<b>Mechanical Drives Training System – Level 1 (SI)</b> consisting of: – Belt Drives 1 (SI) – Chain Drives 1 (SI) – Gear Drives 1 (SI)	46100-10 46866-00 46867-00 46868-00	4	Each	\$	\$

3	<b>Mechanical Drives Training System – Level 2 (SI)</b> consisting of: – Belt Drives 2 (SI) – Chain Drives 2 (SI) – Gear Drives 2 (SI) – Level 2 Accessories (SI)	46100-20 46873-00 46874-00 46875-00 46876-00	4	Each	\$	\$
4	<b>GMI Mobile Workstation</b> – Mobile workstation with storage	MG-88	4	Each	\$	\$
5	Installation and Freight		1	Each	\$	\$
6	Discounts		1	Each	\$	\$
<b>TOTAL</b>					\$	
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

### 2. AC-DC Training System

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>Lab Volt AC/DC Training Systems</b>	3351-00	7	Each	\$	\$
2	<b>eLearning Student Curriculum (Unlimited)</b>	N/A	1	Each	\$	\$
3	<b>MindSight LMS Web Hosted (annual fee)</b> Including: – Unique School Domain(URL) – Automatic curriculum updates – Automatic system updates – Unlimited site license – Access anytime, anywhere	47513-10		Each	\$	\$
4	<b>Curriculum CD-ROM, Unlimited Copies</b>	20316-A0	1	Each	\$	\$
5	Installation and Freight		1	Each	\$	\$
6	Discounts		1	Each	\$	\$
<b>TOTAL</b>					\$	
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

### 3. NEC Industrial Wiring

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>Industrial Wiring Training System-Standard</b> Includes: – Mobile Workstation – Service Entrance 3-Phase Power Bus	46102-20 46801 46802	3	Each	\$	\$

	– Enclosures and Conduits	46810				
	– Electrical Wiring	46811				
	– Electrical Power Distribution	46815				
2	<b>Electrical Wiring Tools</b>	46841	3	Each	\$	\$
3	<b>Enclosures &amp; Conduit Tools</b>	46840	3	Each	\$	\$
4	<b>Industrial Wiring Training System-Level 2</b> Includes:	20316-A0	3	Each	\$	\$
	– Three-Phase Motor Starters	46812				
	– AC Motor Drives	46813				
	– DC Motor Drives	46814				
5	<b>eLearning Student Curriculum (Unlimited)</b> <b>MindSight LMS Web Hosted (annual fee)</b> Including:	46849-E0 47513-10	1	Each	\$	\$
	– Unique School Domain(URL)					
	– Automatic curriculum updates					
	– Automatic system updates					
	– Unlimited site license					
	– Access anytime, anywhere					
6	<b>Curriculum CD-ROM, Unlimited Copies</b>	37866-A0	1	Each		
7	Installation and Freight		1	Each	\$	\$
8	Discounts		1	Each	\$	\$
	<b>TOTAL</b>				\$	
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

#### **4. Process Control**

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>Process Control Training System, w/bench &amp; panels (L,P,F)</b>	6090-B0	3	Each	\$	\$
2	<b>eSeries Student Curriculum</b> <b>MindSight LMS Web Hosted (annual fee)</b> Including:	T.B.R. 47513-10	1	Each	\$	\$
	– Unique School Domain(URL)					
	– Automatic curriculum updates					
	– Automatic system updates					
	– Unlimited site license					
	– Access anytime, anywhere					
3	<b>Curriculum CD-ROM, Unlimited Copies</b>	87996-A	1	Each	\$	\$
4	Installation and Freight		1	Each	\$	\$
5	Discounts		1	Each	\$	\$
	<b>TOTAL</b>				\$	

1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

### **5. HVAC Systems**

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>Electricity Fundamentals Training System</b> includes: – Workstation – Power Source – Switches – Indicator Lights – Resistors – Printed Circuit Board – Capacitors/Inductor – Contactors – Push Buttons – Control Transformer – Relays – Residential Bimetallic Thermostat – Circuit Breaker – Disconnect Switch – Multimeter – Clampmeter – Test Lead Kit	3460-00 3451-00 46200-00 46201-00 46202-00 46203-00 46204-00 46205-00 46206-00 46207-00 46208-00 46209-00 46210-00 46211-00 46212-00 46290-00 46291-00 46295-00	3	Each	\$	\$
2	<b>Electricity Fundamentals 2nd Team Add-on</b> Includes: – Power Source – Switches – Indicator Lights – Resistors – Printed Circuit Board – Capacitors/Inductor – Contactors – Push Buttons – Control Transformer – Relays – Residential Bimetallic Thermostat – Circuit Breaker – Disconnect Switch – Multimeter – Clampmeter	3460-A0 46200-00 46201-00 46202-00 46203-00 46204-00 46205-00 46206-00 46207-00 46208-00 46209-00 46210-00 46211-00 46212-00 46290-00 46291-00	2	Each	\$	\$

	– Test Lead Kit	46295-00				
3	<b>Electricity Fundamentals (Manuals on CD-ROM)</b>	89688-A0	1	Each	\$	\$
4	Installation and Freight		1	Each	\$	\$
5	Discounts		1	Each	\$	\$
	TOTAL				\$	
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

## **6. Industrial Controls**

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>Basic Controls</b> includes: – (1) Mobile Workstation, assembled – (2) Pushbuttons – (1) Selector Switches – (1) Emergency Pushbutton – (2) Pilot Lights – (1) Dual Contactors – (1) Lockout Module – (1) Manual Starter – (1) Contactor – (1) Control Relay – (1) Overload Relay – (1) Time Relay – (1) Fuse Holder – (1) Control Transformer – (1) Cam Switch – (1) Inertia Wheel – (1) Starting Resistors – (1) Brake Motor – (1) Soft Starter – (1) AC Power Supply* – (1) Connection Leads – (1) Fuse Kit for Fuse Holder 3137 – (1) Magnetic Labels Kit #1 – (1) Student Manual – (1) Instructor Guide	8036-10 3103-30 3110-20 3111-20 3114-00 3115-20 3119-00 3125-10 3126-00 3127-20 3130-20 3131-30 3132-30 3137-00 3138-30 3140-30 3147-10 3150-10 3176-A0 3186-00 3196-30 8951-80 37889-00 38503 39163-00 39163-10	4	Each	\$	\$
2	<b>PLC</b> Includes: – (2) Switches – (2) Pilot Lights	8036-20 3112-00 3115-A0	4	Each	\$	\$



	<ul style="list-style-type: none"> <li>– (1) Programmable Logic Controller &amp; Software</li> <li>– (1) Interposing Relays</li> <li>– (1) DC Power Supply</li> <li>– (1) Connection Leads</li> <li>– (1) Student Manual</li> <li>– (1) Instructor Guide</li> </ul>	3128-00 3129-00 3139-00 8951-E0 39436 39436-10					
3	<b>Speed Controls</b> Includes: <ul style="list-style-type: none"> <li>– (1) Power Diodes</li> <li>– (1) DC Motor</li> <li>– (1) AC Variable Speed Drive</li> <li>– (1) DC Variable Speed Drive</li> <li>– (1) Student Manual</li> <li>– (1) Instructor Guide</li> </ul>	8036-30 3165-20 3179-20 3183-00 3184-00 39653 39653-10	4	Each	\$	\$	
4	<b>Sensors</b> Includes: <ul style="list-style-type: none"> <li>– (1) Limit Switch</li> <li>– (1) Back. Sup. Photoelectric Sensor</li> <li>– (1) Pol. Reflective Photoelectric Sensor</li> <li>– (1) Inductive Proximity Switch</li> <li>– (1) Capacitive Proximity Switch</li> <li>– (1) Reflective Block 6085</li> <li>– (1) Student Guide</li> <li>– (1) Instructor Guide</li> </ul>	8036-40 3149-00 6373-B0 6374-B0 6375-B0 6376-B0 6396-00 39654-00 39654-10	4	Each	\$	\$	
5	<b>eSeries &amp; IC Simulation Software</b> <b>MindSight LMS Web Hosted (annual fee)</b> Including: <ul style="list-style-type: none"> <li>– Unique School Domain(URL)</li> <li>– Automatic curriculum updates</li> <li>– Automatic system updates</li> <li>– Unlimited site license</li> <li>– Access anytime, anywhere</li> </ul>	3161-J0 47513-10	1	Each	\$	\$	
6	<b>Curriculum CD-ROM, Unlimited Copies</b>	39436-A0	1	Each			
7	Installation and Freight		1	Each	\$	\$	
8	Discounts		1	Each	\$	\$	
	<b>TOTAL</b>					\$	
1	Optional Maintenance and Support		1	Each	\$	\$	
2	Optional Training		1	Each	\$	\$	
3	Other Costs if any		1	Each	\$	\$	

## 7. Compressor Trainer

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<p><b>Compressor Training System</b>  Allows for the following exercises:</p> <ul style="list-style-type: none"> <li>- Compressor Operation</li> <li>- Lubrication</li> <li>- Belt Tensioning and Alignment</li> <li>- Filter Maintenance</li> <li>- Cleaning Pressure Monitoring</li> <li>- Temperature Monitoring</li> <li>- Mechanical Disassembly and Reassembly</li> </ul> <p>Unit consists of the following:</p> <ul style="list-style-type: none"> <li>- Mobile Frame Constructed from 1.5' Aluminum Extrusion</li> <li>- Locking casters</li> <li>- 2-Stage Piston compressor</li> <li>- Enclosure with Start/Stop control mounted on end</li> <li>- Variable speed drive</li> <li>- Pressure indicators</li> <li>- Temperature indicators</li> <li>- Tank mounted beneath compressor on rolling cart</li> <li>- Oil splash Lubrication</li> </ul>	CTS-101	4	Each	\$	\$
2	Installation and Freight		1	Each	\$	\$
3	Discounts		1	Each	\$	\$
	TOTAL				\$	
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

### 8. Pneumatics Training System

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<p><b>TP101 North America</b>  consisting of:</p> <ul style="list-style-type: none"> <li>- TP 101 America Equipment Set</li> <li>- TP 101 America Courseware</li> <li>- Tubing cutter</li> </ul>	8060282 792258 255851	4	Each	\$	\$
2	<p><b>TP201 North America add-on</b>  consisting of:</p> <ul style="list-style-type: none"> <li>- TP 201 America Equipment Set</li> <li>- TP 201 America Courseware</li> </ul>	8060283 595180	4	Each	\$	\$

	– Power supply unit for mounting frame – 4 mm Safety laboratory cables (106 cables)	162411 571806				
3	<b>Compressor</b> consisting of: – ATC Silent Air Compressor – Compressor accessories	ATC-SA 102725	4	Each	\$	\$
4	Installation and Freight		1	Each	\$	\$
5	Discounts		1	Each	\$	\$
	<b>TOTAL</b>				\$	
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

### 9. Hydraulics Training System

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>TP501 North America</b> consisting of: – TP 501 America Equipment Set – TP 501 America Courseware – Hose line with quick release couplings, 600 mm – (2) Hose line with quick release couplings, 1500 mm – (4) Pressure relief unit	8060227 793157 152960 159386 152971	4	Each	\$	\$
2	<b>TP601 North America Add-on</b> consisting of: – Complete equipment set TP601 in electrohydraulic basics – Power Supply Unit with 4mm Safety – Laboratory Cables (106) – Courseware (English)	8060228 162411 571806 793158	4	Each	\$	\$
3	<b>Learnline Mobile (Single Sided)</b> consisting of: – Learnline mobile with 2 x 700 x 700 mm profile plate and ER frame – Protective cover for weight – Table extension (for PC, books, etc.) – Fixed drawer unit for pneumatics (4 drawers) (qty 2) – Storage plate	572155 541135 566435 535833 539729	8	Each	\$	\$
4	Installation and Freight		1	Each	\$	\$
5	Discounts		1	Each	\$	\$

		TOTAL	\$			
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

### **10. PLC Training System**

Item	Description	Part#	Qty	Unit	Unit Price	Total Price	
1	<b>PLC (Suitcase) Trainer, MicroLogix 1200</b> Includes Communication Cable	3240-40	7	Each	\$	\$	
2	<b>RS Logix Micro</b>	3245-A0	7	Each	\$	\$	
3	<b>Analog I/O Expansion Kit for 3240-4</b>	3244-40	7	Each	\$	\$	
4	<b>Traffic Light Application</b> Includes: – Traffic Lights – User Manual – User Manual	8075-10  3291 85249-20 8524930	4	Each	\$	\$	
5	<b>Electro-Mechanical System (Stepper Motor)</b> Includes: – DC Supply-Stepper Motor – Stepper Motor Drive – Electro-Mechanical Stepper Motor – User Manual/Work Sheets	8075-40  3206 3207 3294 N/A	4	Each	\$	\$	
6	<b>Process Control</b> User Manual/Work Sheets	8075-60	1	Each	\$	\$	
7	<b>eLearning Student Curriculum (Unlimited)</b> <b>MindSight LMS Web-Hosted (Annual Fee)</b> Including: – Unique School Domain (URL) – Automatic curriculum updates – Automatic system updates – Unlimited site license – Access anytime, anywhere	3280-E0 47513-10	1	Each	\$	\$	
8	<b>Curriculum CD-ROM, Unlimited Copies</b>	88270-A0	1	Each	\$	\$	
9	Installation and Freight		1	Each	\$	\$	
10	Discounts		1	Each	\$	\$	
			TOTAL			\$	
1	Optional Maintenance and Support		1	Each	\$	\$	
2	Optional Training		1	Each	\$	\$	
3	Other Costs if any		1	Each	\$	\$	

## 11. Piping Training System

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>Piping Training System</b> Includes: – Pumping Unit – Supports – Storage – Pipe Hangers – Flowmeter – Pressure Gauge – Piping Accessories – Piping Tools – Steel and Iron Pipes – PVC Pipes – Hoses – Tubes – Steel and Iron Pipe Fittings – PVC Pipe Fittings – Hose Fittings – Tube Fittings – Valves – Instrumentation Accessories – Piping Textbooks – Mobile Workstation – Piping Fundamentals-Work Orders-Student – Piping Fundamentals-Work Orders-Instructor	46105	1	Each	\$	\$
2	<b>eLearning Student Curriculum (Unlimited) MindSight LMS Web-Hosted (Annual Fee)</b> Including: – Unique School Domain (URL) – Automatic curriculum updates – Automatic system updates – Unlimited site license – Access anytime, anywhere	46759-E0 47513-10	1	Each	\$	\$
3	<b>Curriculum CD-ROM, Unlimited Copies</b>	39162-A0	1	Each	\$	\$
4	Installation and Freight		1	Each	\$	\$
5	Discounts		1	Each	\$	\$
	<b>TOTAL</b>				\$	
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

## **12. Pumps Training System**

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>Pumps Training System</b> Includes: <ul style="list-style-type: none"> <li>- Pumps Trainer Bench</li> <li>- Expanding Work Surface</li> <li>- Storage Work Surface</li> <li>- Pump Storage</li> <li>- Pump Universal Base</li> <li>- Centrifugal Pump with Mechanical Seal</li> <li>- Variable Speed Drive (Serial)</li> <li>- Digital Paddle Wheel Flowmeter</li> <li>- Digital Pressure Gauge-30" HG-100 psi</li> <li>- Hoses and Accessories</li> <li>- Basic Alignment Kit (stylus)</li> <li>- Tool Kit (tools and shims)</li> <li>- Pyrometer</li> <li>- Current Clamp Meter</li> <li>- Mechanical Seal Repair Kit</li> <li>- Flow Control Valve</li> <li>- Emergency Stop Station</li> <li>- Single Pump Systems-Job Sheets-Student</li> <li>- Single Pump Systems-Job Sheets-Instructor</li> <li>- Single Pump Systems-Work Orders-Student</li> <li>- Single Pump Systems-Work Orders-Instructor</li> </ul>	46105  46701 6302 6309 46702 46704 46720 5927 46730 6553-A0 46790 46732 46791 46734 46735 46740 6421-00 46705-00 37894-20 37894-30 37894-60 37894-70	3	Each	\$	\$
2	<b>Multiple Pump Training System</b> <ul style="list-style-type: none"> <li>- C-Face Centrifugal Pump</li> <li>- Mechanical Seal Repair Kit</li> <li>- Hoses and Accessories</li> <li>- Multiple Pump Systems-Job Sheets-Student</li> <li>- Single Pump Systems-Job Sheets-Instructor</li> <li>- Single Pump Systems-Work Orders-Student</li> <li>- Single Pump Systems-Work Orders-Instructor</li> </ul>	46106-10 46722-00 46744-00 46790-A0 37895-20 37895-30 37895-60 37895-70	3	Each	\$	\$
3	<b>eLearning Student Curriculum (Unlimited)</b> <b>MindSight LMS Web-Hosted (Annual Fee)</b> Including: <ul style="list-style-type: none"> <li>- Unique School Domain (URL)</li> <li>- Automatic curriculum updates</li> <li>- Automatic system updates</li> <li>- Unlimited site license</li> </ul>	46749-E0 47513-10	1	Each	\$	\$

	- Access anytime, anywhere					
4	<b>Curriculum CD-ROM, Unlimited Copies</b>	37894-A0	1	Each	\$	\$
5	Installation and Freight		1	Each	\$	\$
6	Discounts		1	Each	\$	\$
	TOTAL				\$	
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

### **13. Advanced Mechatronics Training System**

Item	Description	Part#	Qty	Unit	Unit Price	Total Price
1	<b>Modular Production System Industry 4.0 (MPS203 i4.0)</b> Includes: - (1) Distributing/Conveyor Station - (1) Joining Station - (1) Sorting Station  <b>Siemens Simatic S7-1512 PLC software with license for fluid engineering, electrical, and logic circuits</b> - (1) 3 Height-adjustable trolleys - (1) 3 Control Consoles with emergency stop - (3) RFID terminals - (1) 3 Safety Doors with plexiglass	8064835	1	Each	\$	\$
2	<b>Curriculum CD-ROM, Unlimited Copies</b> Including: Unlimited site and print license	39436-A0	1	Each	\$	\$
3	Installation and Freight		1	Each	\$	\$
4	Discounts		1	Each	\$	\$
	TOTAL				\$	
1	Optional Maintenance and Support		1	Each	\$	\$
2	Optional Training		1	Each	\$	\$
3	Other Costs if any		1	Each	\$	\$

Estimated project completion time: \_\_\_\_\_ calendar days.

Respondent acknowledges receipt of the following addenda to the captioned RFP (initial if applicable). Failure to properly acknowledge addenda may result in disqualification.

Addendum # \_\_\_\_\_ Initials: \_\_\_\_\_  
Addendum # \_\_\_\_\_ Initials: \_\_\_\_\_

Addendum # \_\_\_\_\_ Initials: \_\_\_\_\_

In submitting this proposal, I certify that \_\_\_\_\_ (Name of Individual/Firm) has not been found guilty in a judicial or state administrative insurer proceeding for unfair business practices within the year preceding the date of this statement.

I further certify that I, or any officer of \_\_\_\_\_ (name of individual/firm), has not served within the past years as an officer of another company which has been found guilty in a judicial or state administrative insurer proceeding of unfair business practice.

Respectfully submitted,

\_\_\_\_\_  
By: Signature and Title

\_\_\_\_\_  
Firm

\_\_\_\_\_  
Date

\_\_\_\_\_  
Address

\_\_\_\_\_  
City

\_\_\_\_\_  
State

\_\_\_\_\_  
Phone Number

\_\_\_\_\_  
Email address



Industrial Mechanics and  
Maintenance Technology  
Degree Plan

## Industrial Mechanics and Maintenance Technology Associate of Applied Science

Texas Southmost College  
Division of Science Technology, Engineering and  
Mathematics/Career and Technical Education

This degree plan is designed for students who seek jobs in industrial maintenance in a variety of industry sectors. The program provides the opportunity to develop skills in many areas including electrical, troubleshooting, maintenance planning, programmable logic control systems, blueprint reading, and welding.

<b>FIRST YEAR - FALL SEMESTER</b>	<b>CREDIT HOURS</b>
ENGL 1301 <sup>+</sup> Composition I .....	3
CETT 1302 <sup>+</sup> Electricity Principles.....	3
INMT 1305 <sup>+</sup> Introduction to Industrial Maintenance .....	3
DFTG 1325 <sup>+</sup> Blueprint Reading and Sketching.....	3
ELPT 1325 <sup>+</sup> National Electrical Code I .....	3
 <b>FIRST YEAR - SPRING SEMESTER</b>	
HART 1303 <sup>+</sup> Air Conditioning Control Principles .....	3
ELMT 1305 <sup>+</sup> Basic Fluid Power.....	3
WLDG 1307 <sup>+</sup> Introduction to Welding Using Multiple Processes .....	3
INTC 1341 <sup>+</sup> Principles of Automatic Control.....	3
MATH 1332 <sup>+</sup> Contemporary Mathematics (Quantitative Reasoning) .....	3
 <b>SECOND YEAR - FALL SEMESTER</b>	
ELMT 1301 <sup>+</sup> Programmable Logic Controllers.....	3
ELPT 1341 <sup>+</sup> Motor Control .....	3
HYDR 1345 <sup>+</sup> Hydraulics and Pneumatics .....	3
INMT 2301 <sup>+</sup> Machinery Installation.....	3
XXXX X3XX <sup>+</sup> Social and Behavioral Sciences Electives.....	3
 <b>SECOND YEAR - SPRING SEMESTER</b>	
SPCH 1315 <sup>+</sup> Public Speaking <i>or</i> .....	3
SPCH 1318 <sup>+</sup> Interpersonal.....	3
PFFB 2308 <sup>+</sup> Piping Standards and Materials .....	3
ELMT 2339 <sup>+</sup> Advanced Programmable Logic Controllers.....	3
INMT 2345 <sup>+</sup> <sup>1</sup> Industrial Troubleshooting .....	3
XXXX X3XX <sup>+</sup> Component Area Option.....	3

**TOTAL CREDIT HOURS FOR GRADUATION - 60**

<sup>+</sup> Grade of "C" or better is required for graduation.

<sup>1</sup> This is a capstone course.

## Electricity Principles

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.1201	CETT	1002	Electricity Principles	Active	0	48	128
15.1201	CETT	1302	Electricity Principles	Active	3	48	96
15.1201	CETT	1402	Electricity Principles	Active	4	64	128
15.1201	CETT	1502	Electricity Principles	Archived #	5	80	144

**Course Level:** Introductory

**Course Description:** Principles of electricity including proper use of test equipment, A/C and D/C circuits, and component theory and operations.

**End-of-Course Outcomes:** Identify basic principles of electricity (A/C and D/C), voltage, current, and circuitry; apply Ohm's law to electrical calculations; use test equipment to measure continuity, voltage, and current values; and use electrical safety practices.

**Lab Recommended**

**CIP Code Description:** 15.1201 (Computer Engineering Technology/ Technician)

**Effective Date:** September 1, 2016

## Introduction to Industrial Maintenance

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.0613	INMT	1005	Introduction to Industrial Maintenance	Active	0	48	96
15.0613	INMT	1305	Introduction to Industrial Maintenance	Active	3	48	96
15.0613	INMT	1405	Introduction to Industrial Maintenance	Archived #	4	64	144

**Course Level:** Introductory

**Course Description:** Basic mechanical skills and repair techniques common to most fields of industrial maintenance. Topics include precision measuring instruments and general safety rules common in industry, including lock-out/tag-out.

**End-of-Course Outcomes:** Identify various types of fasteners common to industrial maintenance; utilize various hand and power tools; utilize precision measuring instruments; and demonstrate proper lock-out/tag-out procedures.

**Lab Recommended**

**CIP Code Description:** 15.0613 (Manufacturing Engineering Technology/Technician)

**Effective Date:** September 1, 2016

## Blueprint Reading and Sketching

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.1301	DFTG	1025	Blueprint Reading and Sketching	Active	0	48	128
15.1301	DFTG	1325	Blueprint Reading and Sketching	Active	3	48	96
15.1301	DFTG	1425	Blueprint Reading and Sketching	Active	4	64	128
15.1301	DFTG	1225	Blueprint Reading and Sketching	Archived #	2	32	48

**Course Level:** Introductory

**Course Description:** An introduction to reading and interpreting working drawings for fabrication processes and associated trades. Use of sketching techniques to create pictorial and multiple-view drawings.

**End-of-Course Outcomes:** Interpret working drawings including dimensions, notes, symbols, sections, and auxiliary views; and sketch pictorials and multi-view drawings.

**Lab Recommended**

**CIP Code Description:** 15.1301 (Drafting and Design Technology/Technician, General)

**Effective Date:** September 1, 2011

## National Electrical Code I

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
46.0301	ELPT	1025	National Electrical Code I	Active	0	32	64
46.0301	ELPT	1225	National Electrical Code I	Active	2	32	64
46.0301	ELPT	1325	National Electrical Code I	Active	3	48	64

**Course Level:** Introductory

**Course Description:** An introductory study of the National Electric Code (NEC) for those employed in fields requiring knowledge of the Code. Emphasis on wiring design, protection, methods, and materials; equipment for general use; and basic calculations.

**End-of-Course Outcomes:** Locate and interpret the sections in the NEC that pertain to electrical installations; calculate the size of conductors, boxes, raceways, and overcurrent protective devices for branch circuits supplying electrical equipment; calculate conductors, overcurrent protection, and service equipment as applied to building services; and compute the size of branch circuits, feeders, and equipment for motors.

**CIP Code Description:** 46.0301 (Electrical and Power Transmission Installation/Installer, General)

**Effective Date:** September 1, 2007

## Air Conditioning Control Principles

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.0501	HART	1003	Air Conditioning Control Principles	Active	0	48	160
15.0501	HART	1303	Air Conditioning Control Principles	Active	3	48	144
15.0501	HART	1403	Air Conditioning Control Principles	Active	4	64	160
15.0501	HART	1503	Air Conditioning Control Principles	Archived #	5	80	160

**Course Level:** Introductory

**Course Description:** A basic study of HVAC and refrigeration controls; troubleshooting of control components; emphasis on use of wiring diagrams to analyze high and low voltage circuits; a review of Ohm's law as applied to air conditioning controls and circuits.

**End-of-Course Outcomes:** Test, repair, and/or replace HVAC-related electrical and control components, wiring and equipment; read, draw, and interpret high and low voltage control circuits.

**Lab Recommended**

**CIP Code Description:** 15.0501 (Heating, Ventilation , Air Conditioning and Refrigeration Technology/Technician)

**Effective Date:** September 1, 2012

## Basic Fluid Power

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.0403	ELMT	1005	Basic Fluid Power	Active	0	48	128
15.0403	ELMT	1305	Basic Fluid Power	Active	3	48	96
15.0403	ELMT	1405	Basic Fluid Power	Active	4	64	128

**Course Level:** Introductory

**Course Description:** Basic fluid power course covering pneumatic and hydraulic systems, fluid power symbols, operating theory, components, and basic electrical and manual controls.

**End-of-Course Outcomes:** Identify fluid power symbols; demonstrate knowledge of basic fluid power theory; demonstrate knowledge of component operation; generate basic fluid power circuits; and demonstrate fluid power circuits using electrical and manual controls.

**Lab Recommended**

**CIP Code Description:** 15.0403 (Electromechanical Technology/Electromechanical Engineering Technology)

**Effective Date:** September 1, 2016



## Introduction to Welding Using Multiple Processes

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
48.0508	WLDG	1007	Introduction to Welding Using Multiple Processes	Active	0	48	160
48.0508	WLDG	1307	Introduction to Welding Using Multiple Processes	Active	3	48	96
48.0508	WLDG	1407	Introduction to Welding Using Multiple Processes	Active	4	80	160

**Course Level:** Introductory

**Course Description:** Basic welding techniques using some of the following processes: Oxy-fuel welding (OFW) and cutting, shielded metal arc welding (SMAW), gas metal arc welding (GMAW), flux cored arc welding (FCAW), and gas tungsten arc welding (GTAW).

**End-of-Course Outcomes:** Demonstrate machine set-up and complete welds and cutting operations; demonstrate basic shop safety; identify types of consumables used in welding processes; identify various welding and cutting practices; and demonstrate proper joint preparation techniques.

**Lab Recommended**

**CIP Code Description:** 48.0508 (Welding Technology/Welder)

**Effective Date:** September 1, 2016

## Principles of Automatic Control

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.0404	INTC	1041	Principles of Automatic Control	Active	0	48	128
15.0404	INTC	1341	Principles of Automatic Control	Active	3	48	96
15.0404	INTC	1441	Principles of Automatic Control	Active	4	64	128
15.0404	INTC	1541	Principles of Automatic Control	Archived #	5	80	128

**Course Level:** Intermediate

**Course Description:** Basic measurements, automatic control systems and design, closed loop systems, controllers, feedback, control modes, and control configurations.

**End-of-Course Outcomes:** Describe the impact of process variables on automatic control; draw loop, block and wiring diagrams; and configure associated equipment.

**Lab Recommended**

**CIP Code Description:** 15.0404 (Instrumentation Technology/Technician)

**Effective Date:** September 1, 2016

## Programmable Logic Controllers

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.0403	ELMT	1001	Programmable Logic Controllers	Active	0	32	96
15.0403	ELMT	1201	Programmable Logic Controllers	Active	2	32	80
15.0403	ELMT	1301	Programmable Logic Controllers	Active	3	48	96

**Course Level:** Introductory

**Course Description:** An introduction to programmable logic controllers as used in industrial environments including basic concepts, programming, applications, troubleshooting of ladder logic, and interfacing of equipment.

**End-of-Course Outcomes:** Explain terminology; select hardware components; predict PLC operation based on ladder logic diagrams; program a PLC to perform various control functions.

**Lab Recommended**

**CIP Code Description:** 15.0403 (Electromechanical Technology/Electromechanical Engineering Technology)

**Effective Date:** September 1, 2016

## Motor Control

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
46.0301	ELPT	1041	Motor Control	Active	0	64	128
46.0301	ELPT	1341	Motor Control	Active	3	64	112
46.0301	ELPT	1441	Motor Control	Active	4	80	128

**Course Level:** Intermediate

**Course Description:** Operating principles of solid-state and conventional controls along with their practical applications. Includes braking, jogging, plugging, safety interlocks, wiring, and schematic diagram interpretations.

**End-of-Course Outcomes:** Identify practical applications of jogging and plugging; describe the types of motor braking and their operating principles; explain different starting methods for large motors; and demonstrate proper troubleshooting methods on circuits using wiring and schematic diagrams.

**Lab Recommended**

**CIP Code Description:** 46.0301 (Electrical and Power Transmission Installation/Installer, General)

**Effective Date:** September 1, 2007

## Hydraulics and Pneumatics

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.1103	HYDR	1045	Hydraulics and Pneumatics	Active	0	64	112
15.1103	HYDR	1345	Hydraulics and Pneumatics	Active	3	64	96
15.1103	HYDR	1445	Hydraulics and Pneumatics	Active	4	80	112

**Course Level:** Intermediate

**Course Description:** Discussion of the fundamentals of hydraulics and pneumatics, components of each system, and the operations, maintenance, and analysis of each system.

**End-of-Course Outcomes:** Demonstrate the operation of basic hydraulic and pneumatic systems including associated instruments; interpret schematics; troubleshoot systems; and design a schematic drawing of a working system.

**Lab Recommended**

**CIP Code Description:** 15.1103 (Hydraulics and Fluid Power Technology/ Technician)

**Effective Date:** September 1, 2016

## Machinery Installation

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.0613	INMT	2301	Machinery Installation	Active	3	64	96
15.0613	INMT	2001	Machinery Installation	Archived #	0	64	112
15.0613	INMT	2401	Machinery Installation	Archived #	4	64	112

**Suggested Prerequisite:** INMT 1305 Introduction to Industrial Maintenance..

**Course Level:** Intermediate

**Course Description:** Students utilize skills acquired in previous studies. Machinery foundation, locations, installation, and alignment activities are practiced and tested. Emphasis is on the various methods of shaft alignment including laser shaft alignment.

**End-of-Course Outcomes:** Perform field layouts for locating machinery; install machinery which includes leveling and securing; explain the applications of the various types of shaft couplings; and align shafts of rotating equipment using various methods.

**Lab Recommended**

**CIP Code Description:** 15.0613 (Manufacturing Engineering Technology/Technician)

**Effective Date:** September 1, 2016

## Piping Standards and Materials

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
46.0502	PFPB	2008	Piping Standards and Materials	Active	0	48	128
46.0502	PFPB	2308	Piping Standards and Materials	Active	3	48	112
46.0502	PFPB	2408	Piping Standards and Materials	Active	4	64	128

**Course Level:** Intermediate

**Course Description:** Identification, description, and application of piping standards and specifications. Includes identification and use of various metallic and non-metallic piping materials, identification and installation of valves, and material take-offs.

**End-of-Course Outcomes:** Identify metallic and non-metallic pipe and tubing; interpret pipe specifications; describe various types of valves and fittings; and explain valve applications.

**Lab Recommended**

**CIP Code Description:** 46.0502 (Pipefitting/Pipefitter and Sprinkler Fitter)

**Effective Date:** September 1, 2012

## Advanced Programmable Logic Controllers

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.0403	ELMT	2039	Advanced Programmable Logic Controllers	Active	0	32	96
15.0403	ELMT	2239	Advanced Programmable Logic Controllers	Active	2	32	80
15.0403	ELMT	2339	Advanced Programmable Logic Controllers	Active	3	48	96

**Course Level:** Advanced

**Course Description:** Advanced applications of programmable logic controllers as used in industrial environments including concepts of programming, industrial applications, troubleshooting ladder logic, and interfacing to equipment.

**End-of-Course Outcomes:** Develop ladder logic to utilize advanced PLC functions; compose a ladder logic program to demonstrate an advanced industrial control application; apply advanced programming techniques for specialized applications.

**Lab Recommended**

**CIP Code Description:** 15.0403 (Electromechanical Technology/Electromechanical Engineering Technology)

**Effective Date:** September 1, 2016



## Industrial Troubleshooting

CIP	Rubric	Number	Course Title	Status	Semester Credit Hrs	Min Cont Hrs	Max Cont Hrs
15.0613	INMT	2045	Industrial Troubleshooting	Active	0	64	128
15.0613	INMT	2345	Industrial Troubleshooting	Active	3	64	128
15.0613	INMT	2245	Industrial Troubleshooting	Archived #	2	48	80

**Suggested Prerequisite:** Proficiency in hydraulic, pneumatic and electrical circuits, mechanical drive systems

**Course Level:** Advanced

**Course Description:** An advanced study of the techniques used in troubleshooting various types of industrial equipment to include mechanical, electrical, hydraulic, and pneumatic systems and their control devices. Emphasis will be placed on the use of schematics and diagrams in conjunction with proper troubleshooting procedures.

**End-of-Course Outcomes:** Demonstrate various troubleshooting techniques; troubleshoot hydraulic, pneumatic, electrical mechanical drive systems using schematics and diagrams.

**Lab Recommended**

**CIP Code Description:** 15.0613 (Manufacturing Engineering Technology/Technician)

**Effective Date:** September 1, 2016