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# AMTEC

## National Center of Excellence in Advanced Automotive Manufacturing



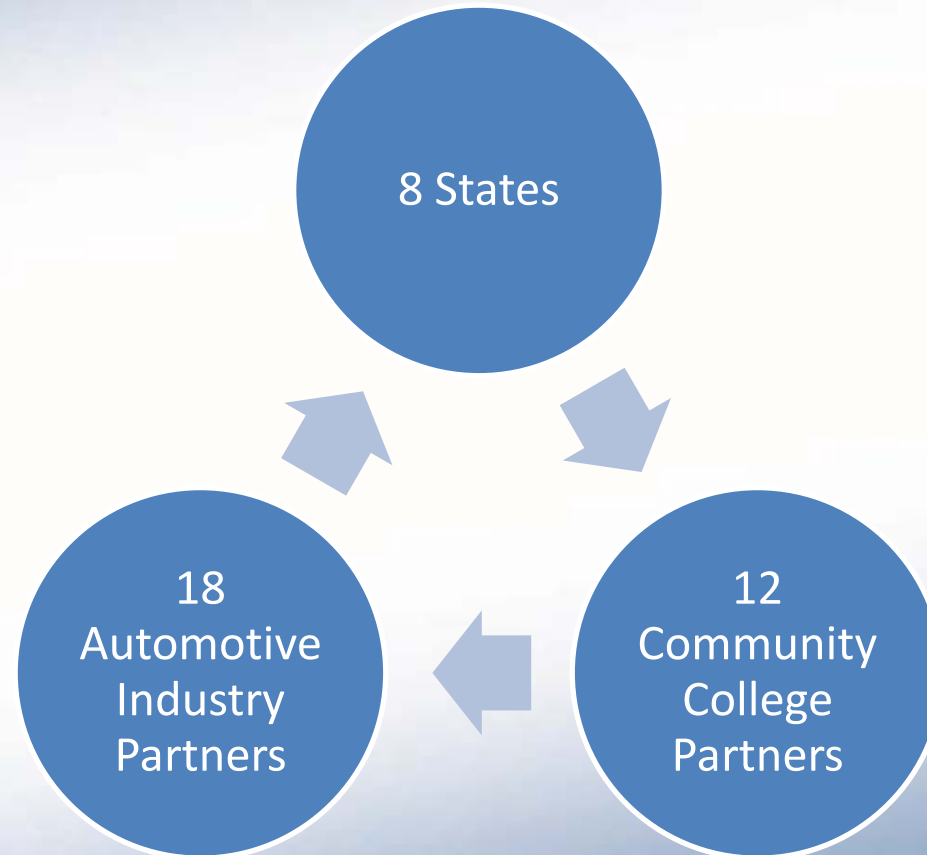
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# A “Big” Collaboration (2008)





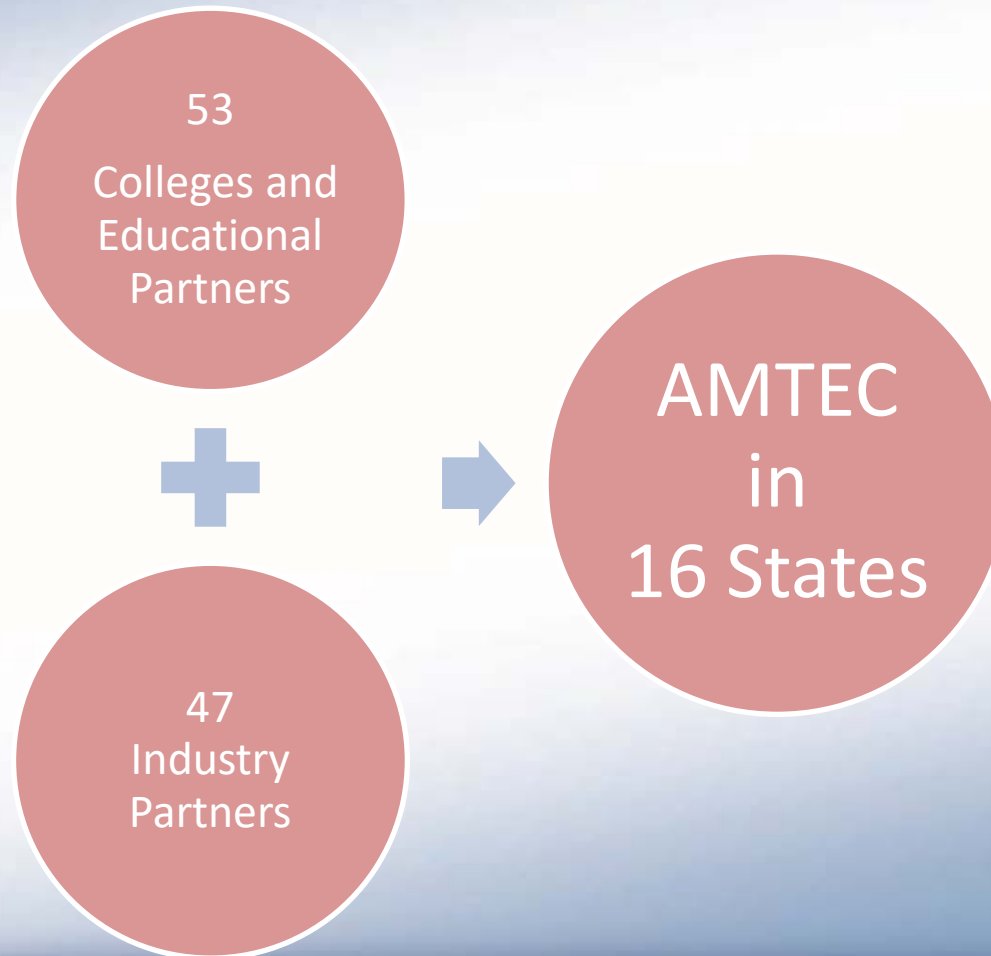
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# A Bigger Collaboration? (2016)





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# AMTEC Products Supported by NBS

## Technical Standards

- Industry Validated
- Multi-Skilled Maintenance

## Online Curriculum

- 13 courses
- 57 modules

## Assessments

- 2 Comprehensive Assessments
- 13 End-of-Course (topic) assessments

# What do you do all day?

## Identified 26 Core Duties & 170 tasks

A	<b>MECHANICAL EQUIPMENT</b>
B	PNEUMATIC/HYDRAULIC EQUIPMENT
C.	STEAM SYSTEM
D.	PREDICTIVE/CORRECTIVE MAINTENANCE
E	BLUEPRINT READING/SCHEMATICS
F	EQUIPMENT CONTROLS AND SENSORS
G	ELECTRICAL EQUIPMENT
H	ELECTRONIC EQUIPMENT
I	NETWORKING
J	PLC EQUIPMENT
K.	MAINTAIN NC/CNC EQUIPMENT
L.	ROBOTS
M	RESISTANCE WELDING
N	ROBOTIC GMAW WELDING
O	FABRICATE
P	COMPUTER LITERACY
Q	PREVENTATIVE MAINTENANCE
R	DUST AND MIST COLLECTORS
S	UTILITIES
T	POWER DISTRIBUTION
U	SPECIALIZED MACHINERY
V	METROLOGY
W	SAFETY AND DOCUMENTATION
X	LASER ETCHER
Y	AUTOMATIC WELDER
Z	SPECIALIZED EQUIPMENT





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## Example “Mechanical Equipment”

Each task defined into sub-tasks and supporting information

A	MECHANICAL EQUIPMENT
1	Troubleshoot/repair/replace brakes & clutches (electromechanical and mechanical)
2	Troubleshoot/repair/replace gears
3	Troubleshoot/replace belts, sheaves/pulley
4	Troubleshoot/maintain chains and sprockets
5	Troubleshoot/repair/replace cams
6	Troubleshoot/repair/replace seals and o-rings
7	Troubleshoot/repair/replace bearings and bushings
8	Troubleshoot/repair/replace shafts
9	Perform alignment and balancing
10	Troubleshoot/repair/replace motors (AC and DC)
11	Maintain couplings
12	Maintain fans
13	Install/maintain valves (cut-off, pressure relief...)

A.	MECHANICAL EQUIPMENT	Tools and Equipment
1	Troubleshoot/repair/replace brakes & clutches (electromechanical and mechanical)	
a	Inspect brake for wear, leaks, damage, excessive wear on pads, etc.	Common hand tools
b	Disassemble discs and pads	Vernier caliper
c	Clean rotors	Micrometer
d	Reassemble	Surface grinder
e	Adjust or set air pressures or mechanical springs	Lathe
f	Set gap on electrical brakes (air gap on electromechanical or gap on mechanical brake)	Milling machine
g	Troubleshoot/repair/replace electromagnet on electromechanical brake	Feeler gauge
h	Set brake and clutch timing using transducers and monitors	Hydraulic press
		Instruction book



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## Curriculum created by Instructional Design Experts using National Standards

	Courses	Clock Time	Lecture	Lab	%
1	Fluid Power and Electrohydraulics/pneumatics	120	60	60	13%
2	General PM and Predictive Maintenance	30	20	10	3%
3	PLC	100	40	60	10%
4	Blueprint Reading/Schematics	30	20	10	3%
5	Robotics	80	40	40	8%
6	Controls and Instrumentation	100	40	60	10%
7	Basic Electricity and Electronics	100	40	60	10%
8	Mechanical Systems/Mechanical Drives/Power Transmissions	100	40	60	10%
9	Safety	40	30	10	4%
10	Computer Literacy	40	10	30	4%
11	Welding and Fabrication	120	24	96	13%
12	Machine Tool	100	20	80	10%
	<b>Total Clock Hours</b>	960	384	576	100%
	<b>Credit (Lecture at 15:1 and Lab at 30:1)</b>		26	19	
				45	





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The courses were broken down into smaller, manageable modules which incorporate the national standards

Mod.	<b>Fluid Power and Electrohydraulics/pneumatics</b>	Lecture	Lab	Standard Link
1	<b>Fundamentals</b>	16		20, 42
2	<b>Flow, Directional, Pressure Control Valves</b>	10	18	13, 14, 17
3	<b>Actuators</b>	6	8	15, 23
4	<b>Pumps and reservoirs</b>	8	8	21,22
5	<b>Fluids and Filters</b>	5	3	18, 19, 25
6	<b>Hose, pipes and tubing fabrication</b>	3	9	16, 24
7	<b>Electrohydraulics/pneumatics</b>	12	14	17,26,27
		60	60	

# AMTEC Assessments

National Standards  
Developed by  
Industry

- 13 Diagnostic Assessments
- Aligned to Subset of National Standards
- Developed by Industry

- 1 General Mechatronic Assessment
- Aligned to National Standards
- Developed by Industry

# Benefits

- Data Analysis
  - Allows AMTEC to determine paths of Professional Development
- Hands-off
  - AMTEC and NBS work seamlessly
- Manpower savings
  - AMTEC does not have the manpower to enroll students, enroll assessment users



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# QUESTIONS