AMTEC

Ignite. Educate. Accelerate.

GENERAL MAINTENANCE MECHATRONICS CURRICULUM

AMTEC is supported by a
National Science Foundation grant.
DUE-0903193

AMT 101: Fluid Power and Electrohydraulics/Pneumatics

- AMT 1011: Fundamentals
- AMT 1012: Reservoirs, Fluids, & Filters
- AMT 1013: Hoses, Pipes, & Tubing
- AMT 1014: Actuators, Pumps, & Accumulators
- AMT 1015: Flow, Directional, Pressure, Flow Control Valves
- AMT 1016: Electrohydraulics/Pneumatics
- AMT 1017: Systems and System Troubleshooting

AMT 102: General PM and Predictive Maintenance

- AMT 1021: Basic PM
- AMT 1022: Advanced Technologies

AMT 103s: PLC (Siemens)

- AMT 1031s: Introduction to PLC's
- AMT 1032s: Hardward and Software (I/O)
- AMT 1033s: Programming PLC's
- AMT 1034s: Communication

AMT 103ab: PLC (Allen-Bradley/Rockwell)

- AMT 1031ab: Introduction to PLC's
- AMT 1032ab: Hardward and Software (I/O)
- AMT 1033ab: Programming PLC's
- AMT 1034ab: Communication

AMT 104: Blueprint Reading/Schematics

- AMT 1041: Drafting Fundamentals
- AMT 1042: Orthographic Interpretation
- AMT 1043: Integrated Systems (Coming Soon!)

AMT 105: Robotics

- AMT 1051: Introduction to Robotics
- AMT 1052: Programming/Editing
- AMT 1053: Maintenance and PM
- AMT 1054: Troubleshooting (TS) Using Error Codes
- AMT 1055: Integration of PLC with Robotics (Coming Soon!)

AMT 106: Controls & Instrumentation

- AMT 1061: Fundamental
- AMT 1062: Sensors & Photoeyes
- AMT 1063: Calibration and Loop Tuning
- AMT 1064: Final Control Elements (Control Valves)

AMT 107: Basic Electricity & Electronics

- AMT 1071: Introduction to Basic Electricity
- AMT 1072: Instruments
- AMT 1073: Components & Circuits
- AMT 1074: Wiring Diagram
- AMT 1075: Solid State Devices
- AMT 1076: Integrated Circuits

AMT 108: Mechanical Systems/Mechanical Drives/Power Transmissions

- AMT 1081: Basic Mechanical Power Transmission (PTDA)
- AMT 1082: Flexible Drives
- AMT 1083: Couplings and Alignment
- AMT 1084: Bearings, Shafts, & Seals
- AMT 1085: Brakes & Clutches
- AMT 1086: Gears & Cams

AMT 109: Safety

- AMT 1091: Basic OSHA Safety
- AMT 1092: Hoists & Cranes
- AMT 1093: Rigging Awareness & Fundamentals
- AMT 1094: Basic First Aid & CPR

DRAFT

AMT 100: Computer Literacy

- AMT 1001: Computer Applications
- AMT 1002: Operating Systems
- AMT 1003: Internet/Intranet
- AMT 1004: Industrial Computer Usage
- AMT 1005: Programming

AMT 110: Welding & Fabrication

- AMT 1101: Introduction to Welding
- AMT 1102: Arc/Stick
- AMT 1103: Mig
- AMT 1104: Oxyacetelyne
- AMT 1105: Fabrication (Coming Soon!)
- AMT 1106: Pipefitting (Coming Soon!)

AMT 120: Machine Tool Operations

- AMT 1201: Introduction to Machining Operations
- AMT 1202: Turning
- AMT 1203: Milling
- AMT 1204: Drill Press
- AMT 1205: Saws
- AMT 1206: Hand & Power Tools
- AMT 1207: Measuring & Layout Tools

DRAFT

AMT 1011: Fluid Power and Electrohydraulics/Pneumatics – Fundamentals (Module 1)

Lecture Contact Hours: 16
Lab Contact Hours: 0

Description:
This module explains the fundamental concepts of fluid power. It covers the principals of fluid power, calculations of physical properties of fluids and their ability to do work. It introduces the various fluid power components, symbols, circuits. It introduces troubleshooting of fluid power components and systems with an emphasis on safety.

Competencies:
1. Describe the aspects of fluid power
2. Describe the basics of fluid power systems
3. Demonstrate satisfactory hydraulic and pneumatic safety knowledge.
4. Perform calculations on fluid power systems
5. Troubleshoot and repair hydraulic and pneumatic gages.
6. Simulate the powering up of hydraulic and pneumatic systems.
7. Recognize the systems for tracking and documenting fluid power components

AMT 1012: Fluid Power and Electrohydraulics/Pneumatics – Reservoirs, Fluids, & Filters (Module 2)

Lecture Contact Hours: 7
Lab Contact Hours: 5

Description:
This module covers functions of hydraulic/pneumatic reservoir and reservoir components. Students will learn properties and requirements for fluids as well as how filters are used to maintain cleanliness in fluid power systems.

Competencies:
1. Demonstrate proper safe practices when working with reservoirs, fluids, and filters
2. Identify reservoir types and components located on fluid power systems
3. Describe functions, properties, and types of hydraulic fluids
4. Maintain fluid levels for hydraulic systems
5. Identify the source and effect of contamination on hydraulic and pneumatic systems
6. Identify types of filters utilized in hydraulic and pneumatic systems
7. Replace filters on hydraulic and pneumatic systems

DRAFT

AMT 1013: Fluid Power and Electrohydraulics/Pneumatics – Hoses, Pipes, & Tubing
(Module 3)

Lecture Contact Hours: 3
Lab Contact Hours: 9

Description:
Hydraulic, and pneumatic fluid power distribution by hoses, pipes and tubing and the fabrication of each system.

Competencies:
1. Learning to Work safely with piping, tubing and hoses and recognize potential hazards and the use of proper personal protective equipment.
2. Use of proper lockout tagout methods
3. Recognize pipe, tube and hose fittings and sizes.
4. Properly inspect systems
5. Properly maintain equipment

AMT 1014: Fluid Power and Electrohydraulics/Pneumatics – Actuators, Pumps, & Accumulators
(Module 4)

Lecture Contact Hours: 8
Lab Contact Hours: 8

Description:
This module explains different types of pumps, actuators and accumulators used in fluid power systems which create flow, change fluid power into mechanical power and devises that store energy in the system.

Competencies:
1. Demonstrate proper safe practices when working with pumps.
2. Describe the type, function, and operation of pumps, actuators and accumulators.
3. Remove, Install and maintain pumps, actuators and accumulators in fluid power systems.
4. Troubleshoot and repair pumps, actuators and accumulators used in fluid power systems.
5. Perform mechanical adjustment and verify proper setting of pressure and flow in pumps, actuators and accumulators.

DRAFT

AMT 1015: Fluid Power and Electrohydraulics/Pneumatics – Flow, Directional, Pressure, Flow Control Valves
(Module 5)

Description:
Hydraulic and Pneumatic Fluid power distribution by hoses, pipes and tubing and the fabrication of each system.

Competencies:
1. Learning to Work safely with piping, tubing and hoses and recognize potential hazards and the use of proper personal protective equipment.
2. Use of proper lockout tagout methods
3. Recognize pipe, tube and hose fittings and sizes.
4. Properly inspect systems
5. Properly maintain equipment

AMT 1016: Fluid Power and Electrohydraulics/Pneumatics – Electrohydraulics/Pneumatics
(Module 6)

Lecture Contact Hours: 10
Lab Contact Hours: 16

Description:
Fundamentals of Electro Fluid Power

Competencies:
1. Ability to work Safely with Electro- Fluid Power systems
2. Ability to utilize schematic drawings to troubleshoot and repair electro-fluid power systems.
3. Ability to recognize Problems and Potential Problems
4. The ability to properly maintain a Electro-Fluid power system
5. Proper use of hand tools, measuring devices (electrical and mechanical)

AMT 1017: Fluid Power and Electrohydraulics/Pneumatics – Systems and System Troubleshooting
(Module 7)

COMING SOON!

DRAFT

AMT 1021: General PM and Predictive Maintenance – Basic PM (Module 8)

Lecture Contact Hours: 6
Lab Contact Hours: 4

Description:
This module, General Preventative Maintenance covers how routine work is done to keep equipment in good working order and to optimize its efficiency and accuracy. Activities in this module include regular routine cleaning, lubricating, testing, checking for wear and tear and eventually replacing components to avoid breakdown.

Competencies:

1. Demonstrate proper safe practices when doing General Preventative Maintenance
2. Collect Oil Samples for Analysis
3. Interpret Oil Analysis Data and Take Action
4. Perform General House Keeping
5. Change Filters
6. Maintain Oil and Grease Levels
7. Perform Equipment Checks
8. Monitor Floor Management Development System (5S)\

AMT 1022: General PM and Predictive Maintenance – Advanced Technologies (Module 9)

Lecture Contact Hours: 14
Lab Contact Hours: 6

Description:
Maintenance departments in modern automotive production facilities have been significantly influenced by quality-improvement philosophies. Gradual, continuous improvement in all aspects of plant operation is the goal of production operation, these same principles all apply to facility maintenance as well. Maintenance personnel can apply these concepts to their maintenance, troubleshooting, and repair tasks in order to continuously improve plant operations and efficiency. This module will introduce the learner to the various types and styles of predictive and preventive maintenance components used in industrial applications.

Competencies:
Upon completion of this course, the student can:

1. Describe the purpose and function of PM and predictive maintenance analyzers.
2. Identify the major safety aspects of testing equipment while operating.
3. Describe the concept of vibration analysis.
4. Define the most common terms related to vibration analysis.
5. Describe the concepts of balancing.
6. Describe and compare the basic types of unbalance.
7. Explain the functions and differences between on-line and off-line motor current analysis.

DRAFT

8. Describe the purpose function of infrared thermography.
9. Explain the operation of portable and stationary temperature-indicating devices.
10. Describe the basic concepts of ultrasonic analysis.
11. Identify the flaws that can be indicated by ultrasonic analysis.
12. Explain the function of logbooks and electronic file record keeping.
13. Describe the function of a computerized maintenance management system

DRAFT

AMT 1031s: PLC – Introduction to Siemens PLC's (Module 10)

Lecture Contact Hours: 10
Lab Contact Hours: 0

Description:
This course introduces the student to the various elements of basic Siemens PLCs including the identification of Siemens Programmable Logic Control Systems as well as Overview of Siemens PLC system architectures, networks and software options. Students will also learn basic numbering systems, computer terminology, PLC functions, program structures, language standards, point addressing basics.

Competencies:
1. Demonstrate knowledge Siemens PLC system architectures.
2. Demonstrate basic numbering systems, computer terminology..
3. Explain the basic PLC functions, program structures and language standards.
4. Construct a basic program.

AMT 1032s: PLC – Programming Siemens PLC's (Module 11)

Lecture Contact Hours: 10
Lab Contact Hours: 20

Description:
The purpose of this module is to help student develop an understanding of programming a Siemens PLC.

Competencies:
Upon completion the student should be able to:
1. Program a Siemens PLC using Simatic 7 S
2. Write and edit basic programs
3. Understand different PLC programming languages.

AMT 1033s: PLC – Siemens Hardware and Software (Module 12)

COMING SOON!

AMT 1034s: PLC – Siemens Communication and I/O (Module 13)

COMING SOON!

DRAFT

AMT 1031ab: PLC – Introduction to Allen-Bradley PLC's (Module 10)

COMING SOON!

AMT 1032ab: PLC – Programming Allen-Bradley PLC's (Module 11)

COMING SOON!

AMT 1033ab: PLC – Allen-Bradley Hardware and Software (Module 12)

COMING SOON!

AMT 1034ab: PLC – Allen-Bradley Communication and I/O (Module 13)

COMING SOON!

DRAFT

AMT 1041: Blueprint Reading/Schematics – Drafting Fundamentals (Module 14)

Description:
This learning module provides the student with the fundamental information in drafting necessary to retrieve read, manipulate and understand a mechanical part print. In addition, he or she should be able to identify different types of prints as well as being able to analyze them.

Competencies:
1. Interpret mechanical drawings
2. Manipulate basic drafting software

AMT 1042: Blueprint Reading/Schematics – Orthographic Interpretation (Module 15)

Description:
This module helps the learner to recognize, identify, describe, and relate the components used in schematics, along with their symbols and connectors, to describe electrical, electronics, pneumatics, hydraulics, and piping circuits, as well as welding and joining symbols interpretation.

Competencies:
1. Interpret pneumatic and hydraulic drawings
2. Interpret electrical schematics
3. Interpret piping & instrumentation diagrams (P&ID)

AMT 1043: Blueprint Reading/Schematics – Integrated Systems (Module 16)

COMING SOON!

DRAFT

AMT 1051: Robotics – Introduction to Robotics (Module 17)

Lecture Contact Hours: 8
Lab Contact Hours: 2

Description:
The purpose of this module is to introduce students to robotics in regards to safety, types of robots, applications, basic components, terms and definitions.

Competencies:
1. Demonstrate satisfactory knowledge of proper robot work envelope safety
2. Identify common robot components
3. Give examples of typical industrial robot applications

AMT 1052: Robotics – Programming/Editing (Module 18)

Lecture Contact Hours: 15
Lab Contact Hours: 15

COMING SOON!

AMT 1053: Robotics – Maintenance and PM (Module 19)

Lecture Contact Hours: 2
Lab Contact Hours: 2

COMING SOON!

AMT 1054: Robotics – Troubleshooting Using Error Codes (Module 20)

Lecture Contact Hours: 10
Lab Contact Hours: 11

COMING SOON!

AMT 1055: Robotics – Integration of PLC with Robotics (Module 21)

Lecture Contact Hours: 3
Lab Contact Hours: 12

COMING SOON!

DRAFT

AMT 1061: Controls & Instrumentation – Fundamentals (Module 22)

Lecture Contact Hours: 6
Lab Contact Hours: 4

Description:
The purpose of this course is to teach the student how to troubleshoot/replace/install circuit boards.

Competencies:
1. Understand ESD and the importance of ESD prevention.
2. Use proper ESD protective procedures in your work day.
3. Properly enter ESD protected areas.
4. Use proper ESD control techniques in the field.

AMT 1062: Controls & Instrumentation – Sensors and Photoeyes (Module 23)

Lecture Contact Hours: 8
Lab Contact Hours: 8

Description:
The purpose of this module is to introduce students to photoeyes, limit switches, proximity switches and other common input devices in regards to installation, maintenance and troubleshooting.

Competencies:
Upon completion of this course, the student will be able to:
1. Identify various sensor types
2. Perform mechanical adjustments
3. Calibrate common sensors
4. Troubleshoot sensors using common methods and principles

AMT 1063: Controls & Instrumentation – Calibration and Loop Tuning (Module 24)

Lecture Contact Hours: 4
Lab Contact Hours: 8

COMING SOON!

AMT 1064: Controls & Instrumentation – Final Control Elements (Module 25)

Lecture Contact Hours: 24
Lab Contact Hours: 38

Description:
In this module, students will be introduced to final control elements including AC, DC, and servo motors, variable speed drives, motor control, relays and motor starters. Students will become proficient in troubleshooting motors and variable speed drives, adjusting speed and direction; interpreting relay logic and sizing of components for various applications.

DRAFT

Competencies:

1. Work safely with various types of motors, relays, and control circuitry
2. Identify major components of AC and DC motors and describe their operating principles
3. Perform basic maintenance and troubleshooting of motors using proper equipment
4. Identify wye and delta motor configurations Analyze and troubleshoot a servo motor with a feedback loop
5. Analyze the various methods of speed control
6. Modify parameters on variable frequency drive
7. Describe position control systems.
8. Distinguish between analog and digital servos.
9. Compare and contrast AC and DC servomotors.
10. Explain the basic operation of a relay and associated contacts
11. Distinguish between relays and contactors.
12. Describe and size a motor starter
13. Interpret, build and modify basic relay ladder logic

DRAFT

AMT 1071: Basic Electricity and Electronics – Introduction to Basic Electricity (Module 26)

Lecture Contact Hours: 10
Lab Contact Hours: 12

Description:
This course introduces the student to the various elements of basic electricity including the identification of electrical symbols as well as interpretation of schematics, cross referencing prints, tracing circuits, interpreting sequential function charts, line drawings and time charts.

Competencies:
1. Demonstrate satisfactory electrical safety knowledge.
2. Demonstrate correct electrical print, diagram and chart tracing.
3. Explain current, voltage, and resistance in an electrical circuit.
4. Explain the correct wire size and color codes according to the NEC.
5. Construct and troubleshoot basic electrical circuits.

AMT 1072: Basic Electricity and Electronics – Instruments (Module 27)

Lecture Contact Hours: 2
Lab Contact Hours: 4

COMING SOON!

AMT 1073: Basic Electricity and Electronics – Components & Circuits (Module 28)

Lecture Contact Hours: 7
Lab Contact Hours: 15

COMING SOON!

AMT 1074: Basic Electricity and Electronics – Wiring Diagram (Module 29)

Lecture Contact Hours: 2
Lab Contact Hours: 4

COMING SOON!

AMT 1075: Basic Electricity and Electronics – Solid State Devices (Module 30)

Lecture Contact Hours: 4
Lab Contact Hours: 10

Description:
An introduction to solid state devices and applications. Covers semiconductor theory and operational characteristics of devices such as the diode, bipolar junction transistor(BJT) and field effect transistor(FET). The basic DC power supply is examined in the lab. Concepts such as polarity, biasing, rectification and amplification are also addressed. Commonly used

DRAFT

automotive manufacturing equipment serve as examples of solid state device application. Discussed are the camera-type vision system, barcode reader and laser etcher.

Competencies:
Upon successful completion of this module the student will be able to:

1. Quickly determine if various solid state devices are functioning properly
2. Understand the importance of following ESD procedures when handling semiconductor boards and components
3. Trace an electrical signal and troubleshoot to the board level
4. Demostrate installation and troubleshooting techniques common to camera-type vision systems, bar code readers and laser etchers.

AMT 1076: Basic Electricity and Electronics – Integrated Circuits (Module 31)

Lecture Contact Hours: 15
Lab Contact Hours: 15

COMING SOON!

DRAFT

AMT 1081: Mechanical Systems/Mechanical Drives/Power Transmissions– Basic Mechanical Power Transmission (Module 32)

Description:
The purpose of this module is to introduce students to the basic concepts of Mechanical Power Transmission. It covers the principles of power transmission, calculations of speed and force and how they affect a power transmission systems ability to perform work. Understanding the basics of mechanical drawing, safe work practices for working around machinery, common hand tools associated with maintenance work and some of the more common terms and definitions.

Competencies:
1. Demonstrate a satisfactory knowledge of working safely with mechanical equipment.
2. Will know proper lockout/tagout procedure.
3. Describe the basic types of mechanical transmission and give examples of positives and negatives of one versus the other.
4. Be able to identify hand tools and the proper use and care of them.
5. Be familiar with general safety practices when working around machinery.
6. Demonstrate a basic understanding of engineering drawings and some of the more common lines, symbols and terms associated with drawings and prints.

AMT 1082: Mechanical Systems/Mechanical Drives/Power Transmissions – Flexible Drives (Module 33)

Lecture Contact Hours: 2
Lab Contact Hours: 4

Description:
A mechanical drive system is a combination of mechanical components that transfer power from one location to another. Mechanical drive systems may also change the size, direction, and speed of the applied force. This includes chains, sprockets, and components. This module will introduce the learner to the various types and styles of flexible chain drives.

Competencies:

AMT 1083: Mechanical Systems/Mechanical Drives/Power Transmissions – Couplings and Alignment (Module 34)

Lecture Contact Hours: 10
Lab Contact Hours: 30

Description:
This module examines the types and functions of couplings used in industrial power transmissions. Students will learn how to install, align, and maintain shaft couplings.

Competencies:
1. Introduce a machine featuring a coupling
2. Demonstrate proper safe practices when working with couplings
3. Name the types and functions of couplings used in mechanical systems

DRAFT

4. Install and replace various coupling systems
5. Maintain and troubleshoot various coupling systems
6. Align various types of couplings using a straight edge and a feeler gage
7. Align shafts using dial indicators
8. Align shafts using precision alignment tools

AMT 1084: Mechanical Systems/Mechanical Drives/Power Transmissions – Bearings, Shafts, and Seals (Module 35)

Lecture Contact Hours: 8
Lab Contact Hours: 12

COMING SOON!

AMT 1085: Mechanical Systems/Mechanical Drives/Power Transmissions – Brakes & Clutches (Module 36)

Lecture Contact Hours: 2
Lab Contact Hours: 4

Description:
A mechanical drive system is a combination of mechanical components that transfer power from one location to another. Mechanical drive systems may also change the size, direction, and speed of the applied force. This includes the application of brake systems and clutch components. This module will introduce the learner to the various types and styles of braking systems and clutches used in industrial applications.

Competencies:

AMT 1086: Mechanical Systems/Mechanical Drives/Power Transmissions – Gears & Cams (Module 37)

Lecture Contact Hours: 8
Lab Contact Hours: 6

Description:
A mechanical system is a combination of mechanical components that transfer power from one location to another. Mechanical drive systems may also change size, direction, and speed of the applied force. This includes the application of the various forms of gears and cam follower components. This module will introduce the learner to the various types and styles of gears and cam follower components used in industrial applications

Competencies:

1. Describe the purpose and function of gears and gear drives.
2. Identify the five gear design categories and their orientation.
3. Describe and compare various gear types.
4. Define the most common gear terms.
5. List the causes of gear failure.

DRAFT

6. Describe and compare the basic types of enclosed gear drives.
7. Explain the functions of seals and breathers.
8. Describe the purpose and types of lubrication essential for gear life.
9. Explain the major factors for selection and installation of gear drives.
10. Describe the basic types of industrial cams.
11. Identify bushing types and operating clearances.

DRAFT

AMT 1091: Safety – Basic OSHA Safety (Module 38)

Lecture Contact Hours: 9
Lab Contact Hours: 1

Description:
Basic OSHA Safety introduces students to OSHA and the OSHA regulations that apply to the auto manufacturing industry.

Competencies:
1. Understand OSHA standards that apply to manufacturing maintenance.
2. Identify hazards in the workplace.

AMT 1092: Safety – Hoists and Cranes (Module 39)

Lecture Contact Hours: 6
Lab Contact Hours: 0

Description:
Introduces the basic concepts and safety rules and issues related to the use of overhead cranes and hoists.

Competencies:
1. Demonstrate satisfactory hoist and crane safety knowledge.
2. Identify the basic types of hoists and cranes.
3. Identify the basic components of hoists and cranes.
4. Identify the types of hoist, trolley, and bridge motions.
5. Recognize the proper hand signals relate to hoist and crane operation.
6. Calculate or verify lifting weights.
7. Explain the proper procedure for positioning straps and/or slings.
8. Explain the proper pre-operation inspection procedures.

AMT 1093: Safety – Rigging Awareness and Fundamentals (Module 40)

Lecture Contact Hours: 10
Lab Contact Hours: 6

Description:
Introduces the basic concepts and safety rules and issues related to the use of rigging equipment, attachment components, calculating sling angle stresses, and safe lifting and turning loads.

Competencies:
Upon completion of this course, the student can:
1. Demonstrate satisfactory rigging safety knowledge.
2. Identify the basic types of equipment used in proper and safe rigging situations.
3. Identify the basic components used in properly and safely rigging a load.
4. Identify the types of rigging attachment equipment.
5. Calculate or verify lifting weights.

DRAFT

6. Identify functions and types of straps and/or slings.
7. Explain the proper pre-operation inspection procedures for slings, chains, and attachments.

AMT 1094: Safety – Basic First Aid and CPR (Module 41)

COMING SOON!

DRAFT

AMT 1001: Computer Literacy – Computer Applications (Module 42)

Lecture Contact Hours: 2
Lab Contact Hours: 6

COMING SOON!

AMT 1002: Computer Literacy – Operating Systems (Module 43)

Lecture Contact Hours: 2
Lab Contact Hours: 6

Description:
Introduces participants to the basics of using computer operating systems in the automotive manufacturing industry.

Competencies:
1. Navigate computer operating systems used in manufacturing
2. Demonstrate ability to upload/download files.
3. Demonstrate ability to load software.
4. Demonstrate ability to map network and drives.
5. Demonstrate ability to use DOS commands.

AMT 1003: Computer Literacy – Internet/Intranet (Module 44)

Lecture Contact Hours: 2
Lab Contact Hours: 6

COMING SOON!

AMT 1004: Computer Literacy – Industrial Computer Usage (Module 45)

Lecture Contact Hours: 2
Lab Contact Hours: 6

COMING SOON!

AMT 1005: Computer Literacy – Programming (Module 46)

Lecture Contact Hours: 2
Lab Contact Hours: 6
COMING SOON!

DRAFT

AMT 1101: Welding & Fabrication – Introduction to Welding (Module 47)

Lecture Contact Hours: 8
Lab Contact Hours: 0

Description:
This is an introductory course to arc welding. This course will introduce the power sources used in SMAW and GMAW welding, along with equipment and filler metals used to produce a welded joint. Welding principles will be introduced along with the metallurgy of steel and welding.

Competencies:
Upon completion of this module the student will be able to:

1. Identify personal protection equipment
2. Identify and explain hazards
3. Identify and explain SMAW power sources
4. Identify and explain SMAW equipment
5. Identify and explain GMAW power sources
6. Identify and explain GMAW equipment
7. Identify and explain SMAW electrodes
8. Identify and explain GMAW filler metal
9. Identify and explain GMAW shielding gasses
10. Explain SMAW principles
11. Explain GMAW principles
12. Explain weld metallurgy

AMT 1102: Welding & Fabrication – Arc/Stick (Module 48)

Lecture Contact Hours: 3
Lab Contact Hours: 47

Description:
The Shielded Metal Arc Welding course is designed to teach welders about arc welding safety and the Shielded Metal Arc Welding process including flat, horizontal, vertical, and overhead welding techniques.

Competencies:

1. Identify personal protection equipment
2. Explain hazards of SMAW welding
3. Identify and prepare SMAW welding equipment
4. Operate SMAW welding equipment
5. Identify and explain SMAW electrodes
6. Demonstrate correct SMAW welding technique
7. Demonstrate SMAW welding in all positions

AMT 1103: Welding & Fabrication – MIG (Module 49)

Lecture Contact Hours: 2
Lab Contact Hours: 28

Description:

DRAFT

Provides knowledge of theory, safety practices, equipment and techniques required for gas metal arc welding including different transfer methods and position welding.

Competencies:

1. Identify personal protection equipment
2. Explain hazards of GMAW welding
3. Identify and prepare GMAW welding equipment
4. Operate GMAW welding equipment
5. Identify and explain GMAW filler metal
6. Identify and explain GMAW shielding gas
7. Demonstrate correct GMAW welding technique
8. Demonstrate GMAW welding in all positions

AMT 1104: Welding & Fabrication – Oxyacetylene (Module 50)

Lecture Contact Hours: 6
Lab Contact Hours: 18

Description:
An introduction to oxy-fuel welding and cutting, including safety, setup and maintenance of oxy-fuel welding and cutting equipment. Techniques taught in this course include cutting, brazing, and welding.

Competencies:

1. Identify personal protection equipment
2. Explain hazards of Oxy/fuel processes
3. Identify and prepare Oxy/fuel equipment
4. Operate Oxy/fuel equipment
5. Identify and explain Oxy/fuel gasses
6. Demonstrate correct Oxy/fuel welding technique
7. Demonstrate correct Oxy/fuel brazing technique
8. Demonstrate correct Oxy/fuel cutting technique

AMT 1105: Welding & Fabrication – Fabrication (Module 51)

Lecture Contact Hours: 0
Lab Contact Hours: 10

COMING SOON!

AMT 1106: Welding & Fabrication – Pipefitting (Module 52)

Lecture Contact Hours: 10
Lab Contact Hours: 10

COMING SOON!

DRAFT

AMT 1201: Machine Tool – Introduction to Machining (Module 53)

Lecture Contact Hours: 4
Lab Contact Hours: 0

Description:
This module introduces the student to machining operations. Emphasis is on the safe application of the most common machining procedures and machines used by multi-skilled industrial maintenance technicians.

Module Competencies:
1. Demonstrate knowledge of standard machine tools.
2. Demonstrate satisfactory knowledge of metal cutting safety.
3. Describe metal cutting.

AMT 1202: Machine Tool – Turning (Module 54)

Lecture Contact Hours: 2
Lab Contact Hours: 14

Description:
This module explains the safe operation of lathes, primarily engine and toolroom lathes. Included are the various types of lathes used in industry, their component parts, and associated safety precautions. Emphasis is on the most common lathe operations required by multi-skilled industrial maintenance technicians.

Module Competencies:
4. Describe the operation of a lathe.
5. Demonstrate satisfactory knowledge of lathe safety.
6. Set up and operate engine lathe.

AMT 1203: Machine Tool Operations – Milling (Module 55)

Lecture Contact Hours: 2
Lab Contact Hours: 20

Description:
This module explains the safe operation of milling machines, primarily vertical milling machines. Included are the various types of milling machines used in industry, their component parts, and associated safety precautions. Emphasis is on the most common milling operations required by multi-skilled industrial maintenance technicians.

Competencies:
1. Describe the operation of a vertical milling machine.
2. Demonstrate satisfactory knowledge of milling machine safety.
3. Set up and operate vertical milling machine.

AMT 1204: Machine Tool Operations – Drill Press (Module 56)

Lecture Contact Hours: 2

DRAFT

Lab Contact Hours: 12

Description:
This module explains the safe operation of drill presses, primarily the sensitive drill press. Included are the various types of drilling machines used in industry, their component parts, and associated safety precautions. Emphasis is on the most common drilling operations required by multi-skilled industrial maintenance technicians.

Competencies:
1. Describe the operation of a drill press.
2. Demonstrate satisfactory knowledge of drill press safety.
3. Set up and operate drill press.

AMT 1205: Machine Tool Operations – Saws (Module 57)

Lecture Contact Hours: 2
Lab Contact Hours: 8

Description:
This module explains the safe operation of saws, primarily the horizontal and contour bandsaw. Included are the various types of metal saws used in industry, their component parts, and associated safety precautions. Emphasis is on the most common sawing operations required by multi-skilled industrial maintenance technicians.

Competencies:
1. Describe the operation of metal cutting saws.
2. Demonstrate satisfactory knowledge of sawing safety.
3. Set up and operate horizontal and vertical bandsaws.

AMT 1206: Machine Tool Operations – Hand and Power Tools (Module 58)

Lecture Contact Hours: 4
Lab Contact Hours: 12

Description:
This module explains the safe and effective use of hand and power tools. Emphasis is on the application of the most common tools used by multi-skilled industrial maintenance technicians.

Competencies:
1. Demonstrate satisfactory knowledge of hand and power tool safety.
2. Use hand and bench tools properly.
3. Use power tools properly.

AMT 1207: Machine Tool Operations – Measuring and Layout Tools (Module 59)

Lecture Contact Hours: 4
Lab Contact Hours: 14

Description:

DRAFT

This module explains the measuring and layout tools commonly found in industrial environments. Emphasis will be on the safe application of the most common tools used by multi-skilled industrial maintenance technicians.

Competencies:

1. Demonstrate satisfactory knowledge of measurement and layout safety.
2. Perform basic and precision measurement.
3. Perform basic and precision layout.

DRAFT