



## **ADDENDUM**

This addendum revises MIAT College of Technology  
Catalog, Volume 62 dated January 4, 2016  
Effective: January 13, 2017

## 32 Programs of Study

### Energy Technology-AAS

The Energy Technology Program is a combination of classroom, hands-on assignments and outside work/homework. Power generation, power plant operations, wind power, compression technology and process systems are covered. Upon successful completion of the Energy Technology program, graduates will have entry-level career choices in a variety of areas in the energy industry to include, **Wind, Gas, Coal, Nuclear, Solar, Standby Power, Geothermal, Hydroelectric, Methane/Landfill Gas Generation, Power Distribution and Dispatch and Water Treatment**. A sample of job titles include: Power Plant Operator, Maintenance Worker/Repairer, Industrial Mechanic, Electrical/Electrician Repairer, Auxiliary Operator, Control Operator, Operations and Maintenance Technician, Field Service Technician, Boiler Operator, Gas Turbine Technician, Wind Turbine Construction Technician, Wind Service Technician, and Solar Installation Technician. Additionally, the general education courses expand and enhance non-technical skills important to the career growth and development of graduates of this program.

**Energy Technology Program**  
**Associate in Applied Science (AAS)**  
**1440 Clock Hours**  
**94 Quarter Credit Hours**  
**All Quarters are a minimum of ten calendar weeks**  
**Day or Afternoon Program**  
**16 Months/7 Quarters**

Course Number	Course Name	Clock Hours	Credit Hours
ET101-1	Learning Skills, History and Math	72	4.5
ET102-1	OSHA	48	3.0
ET103-1	Tools and Professional Skills	48	3.0
ET104-1	Precision Measuring and Rigging	72	4.0
ET107-1	DC Electrical Theory	60	3.5
ET108-1	AC Electrical Theory	60	3.5
ET213-1	Advanced Electrical Theory	84	5.0
ET106-1	Inspection	36	2.0
ET109-1	Climb and Rescue	54	3.0
ET110-1	Wind Operation	66	4.0
ET111-1	Wind Turbine Components	60	3.5
ET112-1	Renewable Energy Sources	60	3.5
ET113-1	Gas Turbine and Co-Generation Operation	66	4.0
ET114-1	Gas Turbine Maintenance	54	3.0
ET115-1	Boiler Operation	90	5.5
ET116-1	Steam Operation	30	1.5
ET209-1	Process Systems and Components	60	3.5
ET211-1	Compression Technology	30	1.5
ET214-1	Materials, Processes, Welding and Advanced Troubleshooting	90	5.0
ET215-1	Refrigeration System Fundamentals and Operation	60	3.5

**GENERAL EDUCATION SECTION**

Course Number	Course Name	Clock Hours	Credit Hours
GE110-3	Intermediate Algebra	40	4.0
GE111-3	English Composition	40	4.0
GE112-3	Public Speaking	40	4.0
GE113-3	Introduction to Sociology	40	4.0
GE114-3	Environmental Sciences	40	4.0
GE115-3	Organizational Behavior	40	4.0

## 36 Programs of Study

### Energy and Industrial Technician Program

The Energy and Industrial Technician Program is a combination of classroom, hands-on assignments and outside work/homework. Power generation, power plant operations, compression technology and process systems are covered. Upon successful completion of the Energy and Industrial Technician program, graduates will have entry-level career choices in a variety of the following areas: **Gas, Coal, Nuclear, Solar, Standby Power, Geothermal, Hydroelectric, Methane/Landfill Gas Generation, Power Distribution and Dispatch, Water Treatment, Equipment Repair and Installation, Testing, Inspecting, Assembly and Production.** A sample of job titles include: Power Plant Operator, Maintenance Worker/Repairer, Industrial Mechanic, Electrical/Electrician Repairer, Auxiliary Operator, Control Operator, Operations and Maintenance Technician, Field Service Technician, Boiler Operator, Gas Turbine Technician, Solar Installation Technician, Manufacturing Technician, Fabricator, Production Technician and Assembly Technician.

#### Energy and Industrial Technician Program

##### Certificate

**960 Clock Hours**

**56 Quarter Credit Hours**

**All Quarters are a minimum of ten calendar weeks**

**Day or Afternoon Program:**

**9 Months/4 Quarters**

Course Number	Course Name	Clock Hours	Credit Hours
ET101-1	Learning Skills, History and Math	72	4.5
ET102-1	OSHA	48	3.0
ET103-1	Tools and Professional Skills	48	3.0
ET104-1	Precision Measuring and Rigging	72	4.0
ET107-1	DC Electrical Theory	60	3.5
ET108-1	AC Electrical Theory	60	3.5
ET213-1	Advanced Electrical Theory	84	5.0
ET106-1	Inspection	36	2.0
ET113-1	Gas Turbine and Co-Generation Operation	66	4.0
ET114-1	Gas Turbine Maintenance	54	3.0
ET115-1	Boiler Operation	90	5.5
ET116-1	Steam Operation	30	1.5
ET209-1	Process Systems and Components	60	3.5
ET211-1	Compression Technology	30	1.5
ET214-1	Materials, Processes, Welding and Advanced Troubleshooting	90	5.0
ET215-1	Refrigeration System Fundamentals and Operation	60	3.5

## 38 Programs of Study

### HVACR Technician Program

The HVACR (Heating, Ventilation, Air-conditioning and Refrigeration) Technician Program is a combination of classroom, hands-on assignments and outside/homework. The program consists of four phases: heating, ventilation, air-conditioning, and refrigeration. Students will develop troubleshooting skills, learn the proper and safe handling of potentially hazardous materials, understand how to balance ventilation systems and develop a variety of other skills necessary to perform the functions of a HVACR technician. Upon successful completion of this program, graduates will have entry-level career opportunities in a variety of areas in the HVACR industry to include, **residential and commercial heating, air-conditioning and refrigeration**. A sample of job titles include: AC Technician, Environmental Technician, Building Maintenance Technician, Industrial Air Handling Technician, Refrigeration Technician, and Furnace Repair Technician.

**HVACR Technician Program  
Certificate  
960 Clock Hours  
57.5 Quarter Credit Hours  
All Quarters are a minimum of ten calendar weeks  
Day or Afternoon Program:  
9 Months/4 Quarters**

Course Number	Course Name	Clock Hours	Credit Hours
HV001-3	Introduction to HVACR and Math	36	2.0
HV002-3	OSHA	18	1.0
HV003-3	Basic Electricity and Motors	66	4.0
HV004-3	Fundamentals of Refrigeration	120	7.5
HV005-3	Heating Systems I	60	3.5
HV006-3	Indoor Air Fundamentals	60	3.5
HV007-3	Heating Systems II	120	7.0
HV008-3	Air Conditioning Systems	48	2.5
HV009-3	Alternative HVAC Systems	72	4.5
HV010-3	Sheetmetal, Installation and Mechanical Codes	54	3.0
HV011-3	EPA 608 and R410A Certification	66	4.5
HV012-3	Fundamentals of Building Management	36	2.0
HV013-3	NATE Core	84	5.5
HV014-3	Domestic Refrigeration	60	3.5
HV015-3	Commercial Refrigeration	60	3.5

# Course Descriptions

## HVACR Technician Program

### **HV001-3 Introduction to HVACR and Math**

This course introduces the student to the career paths and opportunities in the HVACR industry. Professional associations and professional certification are discussed as well. The course also covers basic math and mathematical formulas that will be encountered and used by the technician in performing daily activities.

### **HV002-3 OSHA**

In this course, the student will also learn the safety required in the field while performing tasks on the job. General safety procedures are covered, including Occupational Health and Safety Administration (OSHA) regulation compliance.

### **HV003-3 Basic Electricity and Motors**

The student is introduced to electrical theory and principles, and their application to HVACR systems. This course covers DC and AC circuit operation and electrical fundamentals. Basics such as ohm's law, relays, and transformers will be included. Students will learn about reading circuit diagrams and the application of schematics in equipment troubleshooting and repair. The course will look at summarize the operation of various electronic semiconductor devices and how they are used in HVACR systems. The student will learn the function of various components such as transformers, single-phase and three-phase power distribution, capacitors, the theory and operation of induction motors, and the instruments and techniques used in testing AC circuits and components.

### **HV004-3 Fundamentals of Refrigeration**

Students will learn about the basic components of a refrigeration system and refrigeration systems accessories function, installation and service, as well as the basic refrigeration cycle. Additional topics covered will be heat transfer, heat transfer methods and heat content. Introduction to refrigerants will be included in this course, which will give the student a comprehensive understanding on the different types of refrigerants and the impact of refrigerants on the environment. This course will expose students to the safe and proper procedures of refrigerant handling including refrigerant recovery, recycle and reclaim.

### **HV005-3 Heating Systems I**

This course will cover hydronic heating systems such as hot water boilers and steam boilers systems. The course will cover the different areas such as sizing and equipment selection as well as identifying the various components used in hydronic heating systems. Students will learn about installation and service of hydronic systems.

### **HV006-3 Indoor Air Fundamentals**

The student will examine air movement, measurement including the understanding the concepts of climate and weather, humidity and an understanding of how air movement affects human comfort. The student will study air quality control as measured by temperature, humidity, fresh airflow, pollutants and chemicals in an enclosed space. Air distribution and ventilation system service are discussed during this course.

### **HV007-3 Heating Systems II**

This course will cover heat load calculations, equipment sizing, equipment selection, and equipment installation and service for both residential and commercial setups. Students will be introduced to gas, oil and electric heating systems as well as control systems that operate in combination with heating systems such as thermostats and humidity and energy recovery systems. Students will practice furnace troubleshooting and tune-up using instruments including combustion analyzers, monometers and multi-meters. After completing this course, students will be able to install, troubleshoot and service heating systems.

### **HV008-3 Air Conditioning Systems**

In this course, students will learn about residential air conditioning systems as well as commercial air conditioning systems. The course will expose students to the methods of equipment sizing and selection. Students will practice the proper methods and procedures of installation and troubleshooting for air conditioning systems such as a residential central systems and commercial roof top units. Preventive maintenance will be included in this course.

### **HV009-3 Alternative HVAC Systems**

Students will learn about alternative, non-traditional HVAC systems, such as ductless multi-zone systems and geothermal systems. Students will learn about the components of such systems as well as installation and service.

### **HV010-3 Sheetmetal, Installation and Mechanical Code**

The student will learn system installation, including, gas pipe, drains, electrical and sheetmetal. The student will learn to use a variety of electrical, pressure and temperature measuring devices and will use sheetmetal tools necessary for assembling ductwork. Students will learn about the mechanical codes that regulate the installation of HVACR systems. Students will be exposed to the proper State mechanical codes as well as the International mechanical codes.

### **HV011-3 EPA 608 Certification and 410A**

The student will be introduced to EPA regulations, recovery requirements, leak detection, and repair. At the end of this course the student will be able to take the examination for the EPA 608 Universal Certification. They will also understand the properties and handling of 410A.

### **HV012-3 Fundamentals of Building Management**

Students will learn about the importance of energy conservation as well as the purpose of building controls, protocols and principles of control system troubleshooting and repairs. Students will learn about the role of information technology in HVACR and building management systems installation and services, as well as components that can be added to an existing system to improve energy conservation.

### **HV013-3 NATE Core**

The student will review all associated course materials and be prepared to take the NATE Core examination covering topics such as communication skills, mathematics, basic science, personal ethics and conduct, fabrication tools, safety, heat transfer and comfort, electricity and motors.

## Course Descriptions

### **HV014-3 Domestic Refrigeration**

The student will engage in study of domestic refrigerators and freezers. The student will learn the systems, components of these units. This class also engages the student with installation, troubleshooting, service, and repair of domestic refrigerators and freezers.

### **HV015-3 Commercial Refrigeration**

In this course, the student is introduced to commercial refrigeration systems. This class explains system configurations, high-side components, low-side components, and piping. Special refrigeration systems and applications will be discussed to include transportation refrigeration as well as alternative methods.