

Addendum to the Catalog

Diploma in Refrigeration and Air Conditioning Technician

Credits: 45

Program Description

The Diploma in Refrigeration and Air Conditioning Technician is designed to prepare students for entry-level employment in one of Florida's most in-demand technical fields. The program provides students with the knowledge and hands-on skills necessary to install, maintain, and repair residential and commercial ventilation, air conditioning, and refrigeration systems.

The curriculum integrates classroom instruction, laboratory practice, and work-based learning to ensure students develop technical expertise, safety awareness, and professional competencies. Coursework covers occupational safety and environmental practices, applied mathematics, electrical systems, refrigeration principles, and cooling systems, ductwork and air distribution, piping and brazing techniques, troubleshooting, and system start-up procedures.

In addition, students receive specialized training in automotive refrigeration and air conditioning systems. This component equips graduates with the skills to service and repair automobile climate control systems, expanding their career opportunities beyond traditional residential and commercial refrigeration fields.

Students gain practical experience in state-of-the-art labs, using industry-standard equipment and tools. The program emphasizes compliance with federal, state, and local regulations, including EPA Section 608 requirements for refrigerant handling, OSHA safety standards, and relevant building and energy codes. In addition, students develop employability skills such as teamwork, communication, customer service, and professional ethics that are essential to success in the refrigeration and air conditioning industry.

Graduates of the program will be prepared to sit for industry-recognized certifications, including:

- EPA Section 608 Universal Certification (mandatory)
- OSHA 10 Safety Certification

Program Outcomes

Students will be able to:

- Apply Health, Safety, and Environmental Standards
- Demonstrate Technical Knowledge of refrigeration and air conditioning systems
- Utilize Diagnostic and Troubleshooting Skills
- Integrate Emerging Technologies and Energy Efficiency Practices
- Exhibit Professionalism and Employability Skills

Program sequence will be available at the time of enrollment.

The language of instruction and program delivery modality are subject to availability.

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Course	Title	Credits	Prerequisites
MATH 1200N	College Algebra	3	
OCSE 101	Occupational Safety / OSHA	2	
ELEC 100	Fundamentals of Electricity	1	
ELEC 100L	Fundamentals of Electricity Laboratory	4	
REFR 101	Fundamentals of Refrigeration and Air Conditioning	1	
REFR 101L	Fundamentals of Refrigeration and Air Conditioning Laboratory	4	
REFR 102	Motors and Electrical Controls	1	ELEC 100, ELEC 100L
REFR 102L	Motors and Electrical Controls Laboratory	4	ELEC 100, ELEC 100L
REFR 103	Domestic Refrigeration and Air Conditioning	1	ELEC 100, ELEC 100L, REFR 101, REFR 101L
REFR 103L	Domestic Refrigeration and Air Conditioning Laboratory	4	ELEC 100, ELEC 100L, REFR 101, REFR 101L
REFR 104	Commercial and Industrial Refrigeration and Air Conditioning	1	ELEC 100, ELEC 100L, REFR 101, REFR 101L
REFR 104L	Commercial and Industrial Refrigeration and Air Conditioning Laboratory	4	ELEC 100, ELEC 100L, REFR 101, REFR 101L
REFR 105	Fundamentals of Automobile Air Conditioning	1	REFR 103
REFR 105L	Fundamentals of Automobile Air Conditioning Laboratory	4	REFR 103L
REFR 106	Principles of Renewable Energy and Energy Management	3	
REFR 107	Fundamentals of Hvac Inverters and Variable Refrigerant Volume System (Vrv/Vrf)	3	REFR 103, REFR 103L
REFR 108	EPA 608 - 609 Certification Prep	4	REFR 102, REFR 102L, REFR 103, REFR 103L
TOTAL CREDITS		45	

Notes:

1. This program may be offered in English or Spanish according to demand. COMPLETING A COURSE OR PROGRAM IN A LANGUAGE OTHER THAN ENGLISH MAY REDUCE EMPLOYABILITY WHERE ENGLISH IS REQUIRED.
2. Students must abide with the minimum required hours and policies set by the state and local education agencies for practicum experiences, as applicable.
3. Students must comply with state and local education certification requirements for the diploma program, as applicable.
4. Classification of Instructional Programs (CIP Code): 47.0201 Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician (HAC, HACR, REFR, REFRR).
5. To practice the profession, it is required that the graduate take and pass the exam offered by the Examining Board for Refrigeration and Air Conditioning Technicians of the government of Florida (EPA 608).
6. Graduation GPA: 2.00

COURSE DESCRIPTIONS:

MATH 120ON College Algebra

Credits – 3

The College Algebra course includes the following topics: functions and graphs, polynomial and rational functions, exponential and logarithmic functions.

ELEC 100 Fundamentals of Electricity

Credits – 1

In this course, the basic concepts of electrical circuits and power are studied. In addition, it provides the student with the necessary tools to solve problems related to the field of electricity. It includes the application of electrical safety knowledge, Ohm's Law, Kirchhoff's Law of resistance, circuits and inductors, magnetism and electromagnetism. In addition, content related to the three-phase system, are discussed.

ELEC 100L Fundamentals of Electricity Lab

Credits – 4

This laboratory develops practical skills for handling electrical devices. It introduces the color code of resistance and the alphanumeric codes of capacitors and inductors. It includes techniques for the assembly of circuits in a project card as well as measurement techniques, fault finding, and the use of instruments such as digital and analogue multimeter. The concepts of voltage, currents, and resistances are analyzed. The principles of operation, selection and specifications of the different electrical devices such as resistors, capacitors and inductors are studied.

REFR 101 Fundamentals of Refrigeration and Air Conditioning

Credits – 1

This course studies the history and evolution of refrigeration. The course details the theories about heat and temperature, its nature and relationship with refrigeration. In addition, the concepts of pressure, temperature, compression, evaporation, condensation, refrigerant controls, piping, welding, tools, refrigerant handling, evacuation, loading and calibration of instruments are discussed; and how they interrelate according to the laws of thermodynamics. It includes the principles related to refrigeration theory and cycle, pipeline operations and refrigerant management, their nature and relationship with refrigeration and its applications. In addition, the student will be familiarized with the tools used in the refrigeration and air conditioning pipe, and welding industry. The safety rules and handling of refrigerators CFCs, HCFCs, HFCs HCs and their derived mixtures as regulated by the EPA in the practical performance of their functions are widely explained.

REFR 101L Fundamentals of Refrigeration and Air Conditioning Lab

Credits – 4

In this laboratory, the student applies theoretical knowledge acquired in the REFR 101 course. Through laboratory experiences, he develops manual skills working on the components of the condensing unit:

compressors, refrigerants, pipes and materials for application in different refrigeration systems and domestic and commercial air conditioning.

REFR 102 Motors and Electrical Controls

Credits – 1

This course enables the student to master the operation of the most used electric motors and controls in domestic, commercial and industrial refrigeration systems and air conditioners. There is an emphasis of the study of 120V, 240V and three phase motors. Additionally, students learn to work WYE and DELTA connections systems. Finally, the sequence of operation, diagrams and control components of residential, commercial and industrial refrigeration equipment are analyzed.

REFR 102L Motors and Electrical Controls Lab

Credits – 4

In this laboratory, the student applies the theoretical knowledge acquired in the REFR 102 course. Through laboratory experience, the student has the opportunity to work with control system devices, install one-phase and three-phase motor control systems. The student is exposed so that he can master the operation of the most used electric motors and controls in domestic, commercial and industrial refrigeration systems and air conditioners. Emphasis is placed on the study of 120V, 240V and three-phase motors and on the WYE and DELTA connections of these systems and the sequence of operation, diagrams and control components of residential, commercial and industrial refrigeration equipment is analyzed.

REFR 103 Domestic Refrigeration and Air Conditioning

Credits – 1

This course provides the student with theoretical knowledge about the refrigeration cycle of residential equipment and the cooling system of air conditioners for domestic or residential use. The structural, mechanical and electrical components of the different refrigerators, freezers and the different domestic air conditioning systems used in United States are studied. Installation, maintenance and repair procedures are discussed by applying safety measures. In addition, it includes the process of quotation and preparation of invoices in residential services. It includes content related to the operation, installation and maintenance of hermetic compressors, condensers and evaporators used in refrigeration systems and residential air conditioning. It emphasizes the application of the rules and regulations governing this technology. It develops skills to work on techniques for leak detection, evacuation, refrigerant charge and recovery of domestic refrigeration and air conditioning systems.

REFR 103L Domestic Refrigeration and Air Conditioning Lab

Credits – 4

In this laboratory, the student develops manual skills on the refrigeration cycle of residential equipment and the cooling system of air conditioners. Installation, maintenance and repair procedures are discussed by applying safety measures. The basic concepts of the operation, installation and maintenance of refrigeration equipment and residential air conditioning are applied. It includes content related to the operation, installation and maintenance of: hermetic compressors, condensers and evaporators used in refrigeration systems and residential air conditioning. It emphasizes the application of the rules and

regulations governing this technology. It includes laboratory experiences where the student develops practical skills on the electrical-mechanical operation of refrigerators, freezers, ice machines and other household equipment. Skills are developed to work on techniques for leak detection, evacuation, refrigerant charge and recovery of domestic refrigeration and air conditioning systems.

REFR 104 Commercial and Industrial Refrigeration and Air Conditioning

Credits – 1

In this course, the student is exposed to experiences that will help to acquire the appropriate knowledge related to the installation, repairs, and the diagnosis of different controls and accessories used in commercial and industrial units. It will cover the basic concepts of how commercial and industrial applications of refrigeration are related.

REFR 104L Commercial and Industrial Refrigeration and Air Conditioning Lab

Credits – 4

In this laboratory the student will be exposed to practical experiences to develop the manual skills on the refrigeration cycle and the cooling system of commercial and industrial equipment conditioners. It includes the student's exposure to a suitable scenario to install, repair and diagnose different controls and accessories used in commercial and industrial units. It includes the relationship between the basic concepts learned and the commercial and industrial applications of refrigeration systems. As part of this course, 60 hours of theory are worked on and the student must complete 15 hours of specific external work.

REFR 105 Fundamentals of Automobile Air Conditioning

Credits – 1

This course presents the theory and operation of the automobile air conditioning system. The car's electrical system, air valves and their replacements, types of compressors, condensers and evaporators are studied. In addition, the procedures of installation, maintenance and repair of air conditioners of cars are described. Therefore, this course teaches the theoretical knowledge and skills to offer a high quality service in the installation and repair of these systems.

REFR 105L Fundamentals of Automobile Air Conditioning Lab

Credits – 4

This laboratory offers practical experiences that meet the requirements of the program. Students will demonstrate practical skills on the electrical-mechanical operation of the automobile air conditioning system. It includes the study of the electrical system of the car, air valves and their replacements, types of compressors, condensers and evaporators. In addition, the procedures for installation, maintenance and repair of car air conditioners are applied. Finally, the appropriate skills are worked to offer a high quality service in the installation and repair of these systems.

REFR 106 Principles of Renewable Energy and Energy Management

Credits – 3

In this course, the student is trained with the basic concepts of energy management. The different types of energy and basic concepts that are studied are: where it is located, how we can take advantage of it for residential use and improve the environment. In addition, it discusses the processes for auditing energy, analyzing consumption bills and conducting economic analyses. In addition, electrical and mechanical systems, and how they directly affect energy consumption and management are analyzed. It includes strategies on control systems and other technologies to improve consumption spending.

REFR 107 Fundamentals of Hvac Inverters and Variable Refrigerant Volume System (Vrv/Vrf)

Credits – 3

In this course, the student is exposed to experiences that allow him to acquire the basic theoretical knowledge about the operation of the different components that integrate the Inverter technology in air conditioning systems. The different electronic stages and fault diagnostics in these systems are included. In addition, the basic fundamentals in the operation, characteristics and principles of the components, the electronics and the diagnosis of the systems are discussed. Finally, the student will acquire the appropriate knowledge to install, repair, diagnose the commercial and industrial air conditioning units of Variable Refrigerant Volume (VRV), also known as Variable Refrigerant Flow (VRF), which are a type of system of central air conditioning of multi-split type.

REFR 108 EPA 608 - 609 Certification Prep

Credits – 4

This course is designed to prepare students for the EPA Section 608 and Section 609 Technician Certification Examinations, which are required by federal law for all technicians who handle refrigerants in stationary and mobile (automotive) air conditioning systems. The course provides an in-depth review of the Clean Air Act regulations, refrigerant recovery and recycling procedures, environmental impacts of refrigerants, safe handling practices, and regulatory compliance.

Students will gain knowledge and practical readiness to successfully sit for the EPA 608 Universal Certification Exam (covering Core, Type I – Small Appliances, Type II – High-Pressure Systems, and Type III – Low-Pressure Systems) and the EPA 609 Certification Exam for Motor Vehicle Air Conditioning (MVAC) systems.

OCSE 101 Occupational Safety

Credits – 2

Study of fundamental concepts related to industrial and occupational safety. Emphasis is placed on the development of critical thinking skills and competencies that allow preventive measures to be applied to avoid and/or reduce physical accidents caused by the handling of tools and work equipment, electric shocks, inhalation of toxic gases, explosives, fall prevention, use of ladder and scaffolding; in addition to personal protective equipment (PPE). Includes discussion of inherent risks in entering enclosed and/or confined spaces and the *Wright to Know Act*, and other related topics. It also discusses the regulations of the Department of Labor, OSHA and PROSHO applicable. As part of the discussion, hypothetical and real cases will be analyzed regarding different situations that the student will face in the profession. Teaching-

learning strategies will include practical exercises, demonstrations, conferences, and search and management of information through electronic media.