

HEATING, VENTILATION, AIR-CONDITIONING/REFRIGERATION

MASTER PLAN OF INSTRUCTION

2023 - 2024

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MISSION

The mission of Fort Myers Technical College is to provide high quality career and technical training, in order to prepare students for current and emerging industries, delivered by a professional and caring staff in a positive learning environment.

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Lack of English language skills will not be a barrier to admission and participation. The District may assess each student's ability to benefit from specific programs through placement tests and counseling, and, if necessary, will provide services or referrals to better prepare students for successful participation.



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The Heating, Ventilation, Air-Conditioning/Refrigeration (HVAC/R) program is 1,350 hours of instruction training individuals to attain an entry-level position in the HVAC/R industry. The program covers a broad range of instruction that may be found in the program outline of this Master Plan of Instruction. An appropriate amount of time is spent in each area to thoroughly cover needed instructional material as well as to gain manipulative skills.

The program utilizes both theory and practical application of material to help the students gain needed knowledge and skills. Due to the increasing complexity of systems on today's HVAC/R equipment, it is even more important to know why a procedure is done as well as how it is done. Understanding how a system functions, therefore, has an important role to play in this program of study.

Each student must successfully complete written test material on theory and related topics as well as successfully demonstrate the practical application of this information in the laboratory environment.

Prerequisites for this program should include a background in the sciences such as chemistry and physics on a very basic level, math in general with an emphasis on basic geometry, algebra and measuring. Computer skills are essential for navigating the Internet, accessing computerized simulators, and interfacing with learning management systems.

PROGRAM MISSION

The mission of the Heating, Ventilation, Air-Conditioning/Refrigeration (HVAC/R) program is to prepare students for employment in the HVAC mechanic or installer positions in the HVAC/R field. It is also designed to assist those students who wish to update present skills and cross-train in other HVAC/R areas. The program focuses on student and industry needs. Training is constantly updated by the instructor and program advisory committee to keep current with technological changes.

PROGRAM PHILOSOPHY

We believe that competent workers in the high-performance workplace need:

1. Skills in communication, mathematics, science, critical thinking, teamwork, and effective work habits
2. Training in emerging concepts and technologies
3. Relevant work-based learning experience

We will provide a caring atmosphere that promotes a high degree of student-faculty interaction that fosters development of business and industry partnerships.

PROGRAM CONTENTS

- Fundamentals
- HVAC/R Science
- Refrigeration Systems and Components
- Refrigeration Practices
- HVAC/R Electrical Systems and Components
- Air Conditioning Systems
- Heating Systems
- Heat Pumps
- System Design, Sizing and Layout
- Commercial Environmental Systems
- Commercial Refrigeration Systems
- Installation, Maintenance, Service and Troubleshooting

ESSENTIAL TRAINING TASKS

Physical Requirements

- Maintain a high degree of manual dexterity
- Stoop

- Kneel
- Lift at least 50 pounds and walk with it
- Use voice, hearing, and sight effectively to perform jobs in the HVAC/R field
- Crouch or bend
- High degree of finger dexterity
- Crawl
- Differentiate colors
- Use depth perception
- Work in an atmosphere of loud noise
- Work in an atmosphere of changes in temperature
- Perform repetitive tasks
- Measure accurately
- Work without close, direct supervision
- Work on multiple tasks and priorities
- Perform and complete tasks of relative complexity

Cognitive Requirements

- Handle confrontation and frustration and assist in problem resolution
- Interpret a variety of instructions furnished in written, oral, and diagrammatic form
- Collaborate with others
- Cope with high levels of stress
- Perform mathematical computations at a level of tenth grade or higher
- Make fast decisions under pressure
- Cope with anger, fear, and hostility of others in a calm manner
- Demonstrate a high degree of patience
- Read and understand computers and related equipment
- Work in close or crowded areas
- Communicate effectively with customers, fellow students, and instructional staff

ACCOMMODATIONS

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's IEP or 504 plan or post-secondary student's accommodations plan to meet individual needs to ensure equal access. Post-secondary students with disabilities must self-identify, present documentation, required accommodations if needed, and develop a plan with their post-secondary service provider. Accommodations received in post-secondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology, and special communication systems. Documentation of the accommodations requested and services provided are maintained in a confidential file.

TUITION

Tuition is charged for adult students at a reasonable rate that may vary slightly from year to year and is due prior to the first day of each payment period. Current fee information is available from Student Services. Tuition is waived for eligible high school dual-enrolled students. Failure to pay all fees due at the time class begins will result in the student not being able to attend class and/or clinical.

CLASS SCHEDULE

Classes meet Monday through Friday from 8:00 A.M. until 2:30 P.M. This amounts to 30 hours of classroom instruction per week. Lunch breaks are 30 minutes in length.

ATTENDANCE POLICY

In an effort to develop appropriate employability skills, FMTC students are expected to attend all class sessions. As

is expected in the workplace, when it is necessary to be absent due to illness or emergency situations, all students are to notify the instructor on or before the date of the absence. The student attendance policy for each post-secondary program is consistent with industry standards.

Campus attendance is kept via a computerized system. It is the responsibility of the student to **log in and out** in order to receive credit for class time. This allows the school to keep accurate attendance records for the actual number of hours and minutes attended.

All adult students are expected to be in attendance at least 90% of their scheduled hours during each payment period. Adult students failing to maintain the 90% attendance standard may not be permitted to continue in their program and may be withdrawn.

Absences

A student who is absent for 6 consecutive class sessions, without prior approval and without contacting the instructor, will be withdrawn from enrollment in his/her program.

Students who are late for class, including returning late from lunch, must clock in. Students who leave school early must notify their instructor and clock out. This time out of class is recorded as time absent and is counted against the required 90% attendance.

Adult students who know they will be out of school for an extended period of time may apply for a Leave of Absence from their program. students who exercise a leave of absence may have to extend their time in their program and pay additional fees.

Leaving Campus During School Hours

Students must notify their instructor when leaving campus early. This is for the safety of students, to accurately track time, and to allow the instructor to best utilize instructional resources.

PLAN OF INSTRUCTIONAL PRACTICES

Teaching Methods

HVAC/R theory is taught using a hybrid of face-to-face instruction and interaction with the text material and instructor as well as computerized delivery of text, audio-visual material, and assessments. Teaching aids utilizing digital presentations, DVDs, etc. are used to a great extent throughout all instruction. Practical shop experiences are designed to enhance and reinforce the theories involved as well as to develop manipulative skill and good work and safety practices. Wall charts, specification charts, and other reference materials are on constant display throughout the classroom and laboratory.

A great deal of equipment must be utilized for "hands-on" skill requirements. Test equipment such as multi-meters, amp meters, gauges, recovery machines are used so that the students will acquire rapport in working with such equipment and will have a basis for future troubleshooting requirements.

Materials are reviewed and updated periodically to keep them as current and as relevant as possible.

Safety

A basic outline of safety standards and practices is covered the first week of class along with a continuous implementation of safety principles.

Evaluation

Class performance, quizzes, tests, attendance, portfolio assessments, completion of project assignments, decision-making, work habits, achievement of entry-level competencies, and other methods are used for evaluation. See "Grading Procedures."

Work-Based Activities

Work-based learning activities play an integral part of the curriculum of FMTC's career-technical training programs. These activities are planned with two objectives in mind. First, the activity provides students with the opportunity to develop and apply 'real world' experience using the knowledge and skills attained in the program. Second, the activity provides the instructor with objective input from potential employers or customers of program graduates. Each work-based activity has a written instructional plan outlining objectives, experiences, competencies, and evaluation required during the activity.

Work-based activities are program specific and may include:

- Unpaid in-school shop activities to provide customer service opportunities under the direct supervision of the program instructor.
- Unpaid job shadowing experiences that may include in-school or off-campus employer-based experiences under the supervision of a qualified employer representative who is working closely with the program instructor.
- Paid or unpaid cooperative training experiences conducted at the employer's work location under the supervision of a qualified employer representative and under the direction of the program instructor.

Cooperative Education

Cooperative training is available for students and coordinated by the instructor and career specialist. Cooperative training is for students who have shown competence in program training that indicates readiness for placement in an on-the-job program. High school students participating in the cooperative job placement program must be in the 12th grade. To be eligible for a cooperative education experience, students must have completed at least one-half of the required program hours and requirements.

Student may be returned to the program for additional training if they do not function satisfactorily on the job or when the cooperative agreement is terminated at the request of the student, parent, employer, or program instructor. Veterans will be accepted into the program in accordance with the Department of Veterans Affairs approved program.

Additional information regarding cooperative training opportunities may be obtained from the program instructor or career specialist.

GRADING POLICIES

Grading Categories:

Assessments	20%
Career Application (shop)	20%
Employability Skills	60%

Grading Scale:

A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

Each program has an employability skills rubric based on employee expectations in the industry.

Program Progress

Students are required to complete the program of training within the hours allotted by the state of Florida for completion. Progress must be at a rate that will allow completion of the program with the number of hours stated in the Curriculum Frameworks.

Work Habits

Effective work habits are the cornerstone to successful employment. Students are expected to demonstrate productive work habits during all phases of enrollment. Instructors will work with students who need assistance in this area to

improve all overall possibility for successful employment.

Attendance: Attends class, arrives/leaves on time; begins and ends work as expected.

Character: Displays loyalty, honesty, trustworthiness, dependability, reliability, initiative, self-discipline, and self-responsibility; displays a high level of effort and commitment to performing and completing work.

Teamwork: Respects the right of others; respects confidentiality; is cooperative; is assertive; displays a customer service attitude; seeks opportunities for continuous learning; demonstrates mannerly behavior; encourages and facilitates cooperation, pride, trust, and group identity; fosters commitment and team spirit.

Appearance: Displays appropriate dress, grooming, hygiene, and etiquette; wears full regulation uniform.

Attitude: Displays a willingness to cooperate and accept constructive criticism; sets realistic expectations; approaches assignments with interest.

Productivity: Is prepared for class by reading assignments and completing homework; contributes to class discussions; and involvement in lab activities (in other words, no sleeping or daydreaming). Follows safety practices; conserves and maintains equipment and supplies; keeps work area neat and clean; follows directions and procedures; makes up assignments and tests punctually; notifies proper authorities of situations presenting potential safety hazards; does not use or knowingly permit others to use tools and equipment improperly; stays on task and utilizes time constructively.

Organization: Manifests skill in prioritizing and managing time and stress; demonstrates flexibility in adapting to changes.

Communication: Communicates accurate information to others in a professional and courteous manner; displays appropriate nonverbal (eye contact, body language) and oral (listening, telephone etiquette, grammar) skills; asks pertinent questions; listens attentively to others, notifies instructor in advance of absences or tardies.

SATISFACTORY ACADEMIC PROGRESS

In order to receive and continue to receive financial assistance of any type, a student must maintain satisfactory academic progress. The Financial Aid Administrator will require a progress report to be completed and submitted to the Financial Aid Office prior to each disbursement.

Students are considered to be making Satisfactory Academic Progress (SAP) if they successfully complete their scheduled clock hours, achieve a specific cumulative grade average (CGA), and do not exceed the maximum time limits to complete their course of study. Each student's academic progress will be checked at 450 clock hours (300 hours for CHCA) and prior to subsequent disbursements for students enrolled in programs one academic year or greater. Progress will be checked at the half-way point for programs less than one academic year.

No SAP is required prior to the first disbursement.

REQUIREMENTS FOR CERTIFICATE

Certification for FULL program completion is determined by (1) mastery of 85% of program competencies as determined by the instructor, (2) a final grade of 75% or better (80% Health Sciences) in each course, and (3) proof of state-mandated basic skills levels; (4) attendance of a minimum of 90% of scheduled program hours (95% of scheduled hours for some Health Science programs). Under unique circumstances, instructors in our competency-based programs have the discretion to graduate students who fall short of 90% as long as #1-3 above are met. Students meeting these requirements are awarded a full program certificate.

A record of the student's progress is kept up-to-date by the instructor and available to the student in the FOCUS Student Portal. High school grades are reported to the assigned high school.

STUDENT DRESS CODE

Each program at FMTC has a designated uniform.

Uniform Required: FMTC uniform khaki work shirt, work pants or jeans, and work shoes or boots with leather uppers and non-conductive soles and heels (canvas uppers on shoes are not acceptable), visible FMTC student ID badge.

PROGRAM STRUCTURE

Below is a summary of the Heating, Ventilation, Air-Conditioning/Refrigeration (HVAC/R) program structure. For more detailed information for each course, visit the FLDOE Curriculum Framework website:

<https://www.fldoe.org/academics/career-adult-edu/career-tech-edu/curriculum-frameworks/2023-24-frameworks/architecture-construction.stml>.

OCP A Introduction to HVAC/R

A student completing this course could possibly find employment as an HVAC/R helper with introductory knowledge of electrical components and their function.

OCP B HVAC/R Fundamentals

A student completing this course could possibly find employment as an HVAC/R mechanic's assistant with introductory knowledge of system components and their function, refrigerants and their applications, and be EPA Certified for Proper Refrigerant Usage.

OCP C HVAC/R Service Practices

A student completing this course could possibly find employment as an HVAC/R Mechanic with introductory knowledge of system and piping design, start-up and shut-down procedures, and duct sizing.

OCP D HVAC/R Intermediate Service Practices

A student completing this course could possibly find employment as an HVAC/R Mechanic with advanced knowledge of system and piping design, start-up and shut-down procedures, and duct sizing.

OCP E HVAC/R Advanced Service Practices / OR / HVAC/R Advanced Commercial and Industrial Service Practices

A student completing this course should find employment as an HVAC/R entry-level maintenance technician, service technician, or commercial refrigeration service technician.

TEXTBOOKS

Required textbooks for the Heating, Ventilation, Air-Conditioning/Refrigeration (HVAC/R) program can be found on the disclosure fee sheet located on the program's page on the FMTC website:

<https://fortmyerstech.edu/course/air-conditioning-refrigeration-heating-technology/>