



Lake Technical College

**Program Requirements and Expectations  
And Master Plan of Instruction**

***Heating, Ventilation, Air-Conditioning/  
Refrigeration (HVAC/R) 1***

***Steve Bagg, Instructor***

**2022-2023**



*The mission of Lake Technical College is to be an integral component of the economic growth and development in our communities by offering a variety of high quality career-education and training opportunities.*

*Lake Technical College does not discriminate on the basis of race, religion, color, national origin, gender, genetic information, age, pregnancy, disability, or marital status in its educational programs, services or activities, or in its hiring or employment practices. The district also provides access to its facilities to the Boy Scouts and other patriotic youth groups, as required by the Boy Scouts of America Equal Access Act, or any other youth group listed in Title 36 of the United States Code as a patriotic society.*

# LAKE TECHNICAL COLLEGE

## Program Requirements and Expectations

### ADMISSION REQUIREMENTS

Applicants must be at least 16 years of age and should be academically, physically, and emotionally capable of meeting the demands of the chosen program. Applicants make initial application through the Admissions Office. A minimum skills evaluation is part of the admission process.

The Career and Technical Education programs have the following minimum admissions requirements:

1. Complete an LTC online application.
2. Take the basic skills examination, if required.
3. Meet with a career advisor.
4. Fulfill additional entry requirements as needed for individual programs.

A high school diploma or GED is not required to enroll in most programs. However, it is **recommended that all students complete either a high school diploma or a GED prior to program completion.**

### TESTING REQUIREMENTS

All applicants for Career and Technical Education (CTE) programs 450 hours or more, with the exception of Florida Law Enforcement Academy and Paramedic applicants, take a state mandated basic skills evaluation prior to enrollment. Basic skills evaluation scores must be valid at the time of enrollment. Testers must be 16 years of age or older.

If a student has met or exceeded standard scores on one area of one test, they may use another test to meet the additional skill area requirements. It is acceptable to combine test scores from more than one test. (Rule 6A-10.315, F.A.C.)

Assessment instruments meeting this requirement include:

Per 2020, FS [1008.30](#) – Common placement testing for public postsecondary education and [Rule 6a-10.040](#) (eff. 2/16/21)

*No expiration date:*

- Tests of Adult Basic Education (TABE), Forms 11 and 12, 2017;
- Comprehensive Adult Student Assessment System (CASAS), GOALS 900 Series, 2019;
- 2014 GED® Tests: Reasoning through Language Arts and Mathematical Reasoning where a minimum score as required in [Rule 6A-6.0201, F.A.C](#) (eff. 3/23/16), has been attained on each test.

*Good for 2 years from the date of testing:*

- A common placement test where a minimum score has been achieved pursuant to [Rule 6A-10.0315, F.A.C.](#)(eff. 9/24/19);
- PERT, SAT, The College Board, ACT, Next Generation, ACCPLACER, The College Board

Per 2020, FS [1004.91](#), FS [1008.30](#), and the [2021 CTE Basic Skills Assessment Technical Assistance Paper](#) – Requirements for career education program basic skills – Programs 450 hours or more

- An adult student with a disability may be exempted. (per [Rule 6a-10.040](#)(eff. 2/16/21), FS [1004.02\(6\)](#)(eff. 2020) – must follow LTC policy and process);
- A student who possesses a college degree at the associate in applied science level or higher;
- Any student who entered 9th grade in a Florida public school in the 2003-2004 school year, or any year thereafter, and earned a Florida standard high school diploma. (*Graduated 2007+*)
- A student who is serving as an active duty member of any branch of the United States Armed Services;
- A student who passes a state or national industry certification or licensure examination that is identified in State Board of Education rules and aligned to the career education program in which the student is enrolled;
- An adult student who is enrolled in an apprenticeship program that is registered with the Department of Education in accordance with chapter 446;

- A student who demonstrates readiness for public postsecondary education pursuant to s. [1008.30](#) (see *testing chart below*) and applicable rules adopted by the State Board of Education. If a student has met or exceeded standard scores in one area of one test, another test may be used to meet the additional skill area requirements. It is acceptable to combine test scores from more than one test;
- A student who was previously tested and referred to developmental education at a Florida College System (FCS) institution college may be reported as meeting basic skills requirements once they successfully complete the required developmental education and will not need to be retested.
- Students enrolled in school district or FCS institution law enforcement training academies are not subject to basic skills exit requirements in s. 1004.91 F.S. or Rule 6A-10.040 F.A.C. The Florida Department of Law Enforcement (FDLE) has designated the Florida Basic Abilities Test (FBAT) for use with these students; please refer to [s. 943.17\(6\), F.S.](#), for more information.

Applicants transferring appropriately leveled TABE, CASAS GOALS, GED® test sections, or other common placement tests must do so by having an official score report sent directly to the Admissions Office prior to enrollment in the program. Scores brought by hand will be accepted only if the document provided by the outside testing center is in a sealed envelope.

### **Remediation of Basic Skills**

According to Florida Department of Education rules, students who do not meet basic skills exit scores may only retake after 60 documented hours of remediation or three months if no documented remediation is available. Students may not retake the same test version for six months. We, therefore, strongly recommend that students test early, especially for licensure programs, in order to allow time for remediation and retesting should the need arise.

Students who do not meet the minimum basic skills exit scores set by the Florida Department of Education for their program may begin attending remediation classes prior to or at the time of enrollment in a Career and Technical Education program and make acceptable progress as determined by the AAAE faculty member. It is highly recommended students meet state mandated basic skills requirements by the time they have completed 50% of their program. Students who do not meet state mandated basic skills exit scores may not receive a certificate of completion as per Florida Department of Education rules.

Some basic skills test scores are only good for two years and must be valid at the start date of the initial enrollment period. Basic skills test scores that expire during continuous enrollment remain valid until the end of such enrollment. Under continuous enrollment, students must be enrolled at least 50% of each semester. Continuous enrollment applies to attendance in a single program.

## **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 postsecondary student's accommodations plan to meet individual needs to ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their postsecondary provider.

Students desiring accommodations or updates to their accommodations are encouraged to self-identify before or as soon as possible to the Special Populations Coordinator and provide documentation that clearly shows evidence of a disability and applicable accommodations. The Special Populations Coordinator will schedule a meeting with the student and faculty to discuss the documented disability and applicable accommodations.

Accommodations received in postsecondary 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, assessments, time demands, schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodation requested and provided is maintained in a confidential file.

Students in need of academic accommodations for a disability may consult with the Special Populations Coordinator to arrange appropriate accommodations. Students are required to give reasonable notice (typically 5 working days) prior to requesting an accommodation.

## **TUITION**

Tuition is charged to adult students at a rate established by the State legislature. Current fee information is available in the Admissions Office. Tuition is waived for eligible high school, career dual enrolled students. Tuition is due prior to the first

day of each payment period based on the Lake Technical College payment calendar. Failure to pay fees at the time class begins may result in not being able to attend class and/or clinical.

## INSURANCE

Personal injury/school accident insurance is required for all Career and Technical Education students. This insurance is provided through Lake Technical College at the rate of \$1.50 a month. The accident insurance fee will be charged to students per payment period.

Health programs with clinical experiences require liability insurance in conjunction with requirements by the healthcare facilities. The liability insurance fee is charged to students at the time of enrollment.

## ATTENDANCE POLICY

### **Guidelines for All Students**

In an effort to develop professional skills, regular attendance is required of all students. Students are expected to be in their class promptly in the morning, after break, and after lunch. If it is necessary to be absent due to illness or emergencies, all students are to notify the faculty member as soon as possible prior to the start of class, as is expected in the workplace. Students may be eligible to have up to 10% of the hours in a program per pay period as excused absences. LTC employs a Student Retention Specialist who works with students and faculty to track attendance, assists in developing strategies to improve attendance, and coordinates make-up time.

*Enrollment Period* – period of time a student begins his education and training in a CTE program (i.e., August 15<sup>th</sup>, January 3<sup>rd</sup>) through the date of withdrawal or completion.

*Payment Period* – a set block of time in which a student pays for program hours (i.e., 300 hours, 450 hours)

*Excused absence* – one that is unforeseeable, unavoidable, and/or unusual. Examples of excused absences include but are not limited to personal illness, court appearance, medical appointment, insurmountable conditions such as extreme weather conditions, religious observances, communicable disease outbreaks, and local conditions determined by LTC, and death in the immediate family. Documentation may be required. No more than 10% of program hours per payment period may be excused.

*Unexcused absence* – Absences that fall outside of the excused category. Students may make up a maximum of 5% of unexcused absences per payment period. Unexcused absences exceeding this amount will remain unexcused and may result in discipline and/or dismissal from the program. Make-up time must be completed within a reasonable amount of time in order remain in pace with the class and to remain in good standing with Lake Tech.

*Make-up time* – Students are required to successfully complete hours missed via attendance during designated hours outside of the regularly scheduled program hours. Failure to complete make-up time may result in withdrawal from the program. Make-up hours may not exceed 5% of the scheduled hours in the payment period. There is a \$25.00 make-up time fee per payment period.

Students in non-licensure programs must have achieved a minimum of 85% attendance at the end of each payment period. If the student's attendance does not improve but drops below 75%, the student may be withdrawn unless documentation regarding extenuating circumstances is provided to the Student Retention Specialist. School Intervention Team (SIT) meetings will be held as necessary to attempt to alleviate issues resulting in excessive absences and to counsel the student of possible alternatives and consequences. Students may be placed on attendance contracts. Students on attendance contracts are deemed to be on academic probation.

*\*Note: licensure program attendance policies may be more rigid due to licensure requirements and supersede this policy.*

Regularly scheduled class hours will be reported for attendance. Coursework completed at home will not count toward hours in a program. Students will be enrolled in additional hours if needed. Current tuition and fees will apply.

*Excessive absences* - A student who is absent for six (6) consecutive class sessions will be withdrawn from his/her program. A student must petition and be approved in order to return. Students exhibiting a pattern of consecutive absences of less than six days will be subject to dismissal as determined by a School Intervention Team. A School Intervention Team will review all petitions for re-enrollment. No additional fees will be charged if the student returns during that current payment period, provided fees have not been refunded.

The excessive absences policy also applies to the adult education student. If the student requests to be re-enrolled during the same enrollment period, he or she will be assessed a \$10.00 re-enrollment fee. This may be waived depending upon mitigating circumstances.

Students with excessive absences will face the possibility of the loss of financial aid, lower professional skills grades and the ability to continue in the program.

### **Leaving Campus During School Hours**

For safety reasons, students will notify their faculty when leaving campus early. Students may leave campus for lunch provided this is done within the allotted time.

## **PLAN OF INSTRUCTIONAL PRACTICES**

### **Teaching Methods**

Lecture, demonstration, discussion, group interaction, verbal and written quizzes, skill practice, individualized instruction, computerized tutorials, interactive learning, web-based learning, textbooks, workbooks, projects, journals, reports, simulations, hands-on computer experience, collaborative learning, video-taped instructions, guest speakers, field trips, customer service projects, program job shadowing, cooperative on-the-job training, interactive learning, and web-based learning are among the teaching methods utilized.

Among the provisions made to allow for individual differences are pre-testing to determine entry level, workbooks and study guides for progress at individual rate, progress grading, individualized instruction, individual project assignments, and referral for basic skills remediation.

### **Online Access**

Technology is an integral part of our daily lives. From smart phones to electronic tablets, these devices are becoming items that many cannot function without. In addition, the Internet is changing the way education is delivered. Lake Technical College strives to ensure that our students are able to compete in this technology driven world. With this in mind, it is recommended that students have an online presence and access to the internet.

It is also important that students have an email address that they check on a regular basis. A lot of information may come to you through your email, so it is important that you check it regularly. If you do not have an email address, there are numerous services that provide FREE email addresses. Please make sure your faculty have a current, working email address for you. See your faculty for more information.

### **Social Media**

The advent of social media has created a world-wide communication medium for persons of all ages. While extremely popular, these websites have also created their own set of “not-so-popular” problems such as cyber-stalking, identity theft, cyber-bullying, cyber-cheating (posting of exam, or other course material), and a host of other nebulous challenges that users may face. Another reality associated with social media is its far-reaching consequences for those who share posts that may be seen by others as inappropriate.

Potential employers, current employers, civic, or educational organizations you may be associated with, and many others are looking at social media sites for information that may tell them things about an individual. Students should also be cautioned on how private their social media content really is – despite the settings on an account. All social media sites are potentially vulnerable. A simple search of how to view pages that are set as “private” for a popular social media website yielded numerous responses for ways to view the content. Everything from blogs to online videos offer to explain how to accomplish this task.

Students in all programs need to be cognizant of the fact that most professions rely on great moral character. It is recommended that when using social media, assume that all posts will be seen/read by everyone with access to the internet.

### **Evaluation**

Class performance, quizzes, tests, attendance, portfolio assessments, completion of project assignments, decision-making, professional skills, 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 LTC’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 a “real world” experience using the knowledge and skills attained in the program. Second, the activity provides the

faculty 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/lab activities to provide customer service opportunities under the direct supervision of the program faculty.
- 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 faculty.
- 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 faculty.

### **Cooperative Education**

Cooperative training is available for students and coordinated by the faculty. 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 at least grade 12. Students must be enrolled in their last course of their program in order to participate in Co-op. In addition, basic skills exit levels must be met and the student can have no outstanding debt with the school. Students must be approved for Co-op prior to beginning, including clearance through financial aid.

Students 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 faculty.

Veterans will be accepted into the program in accordance with the Department of Veterans Affairs approved program.

Additional information regarding co-op opportunities may be obtained from the program faculty.

### **Job Shadowing**

Job shadowing experiences, or volunteer experiences, are available to students as part of their program training. These experiences are designed to give the student actual hands-on experience doing a variety of related tasks. Length and type of experiences will vary. The program faculty determines appropriateness of the experience. Additional information regarding job-shadowing experiences may be obtained from the program faculty.

### **Career Dual Enrollment Students**

All students enrolled in Lake Technical College are expected to function as adults. High school students will be held to the same behavioral and performance standards as adult students.

## **GRADING PROCEDURE**

### **Grading Scale**

The grading policy for this program is as follows:

90-100	Excellent
80- 89	Passing
< 80	Failing

Lake Technical College is a postsecondary institution designed to provide trained individuals to industry. The grading scale for this program reflects industry standards. The approved postsecondary program grading requirements must be met if the student is to receive a certificate.

Program grades are based on the three criteria: Skills, Knowledge, and Professional Skills. Each area counts as one-third of the grade. Students have access to final course grades through the student portal. A minimum grade of 80% in each area is required in order to receive a passing grade. If a student's grade is below 80%, the student will be counseled as to what steps need to be taken to bring the grade to a satisfactory level.

Licensure programs may have a grading scale reflective of their industry that varies from the above.

### **Program Progress**

Students are expected to complete the program of training within the hours allotted by the State of Florida for completion. The student's rate of progress will be closely monitored by the faculty and the Student Retention Specialist to ensure program completion in a timely manner. Most tests, projects, and similar assignments must be completed in class under the direction of the instructor.

## **Requirements for a Certificate**

All competencies specified in the State of Florida Curriculum Framework for the program must be successfully completed with at least an 80 percent in the areas of skills, knowledge, and professional skills. Students must also meet minimum TABE requirements prior to graduation.

## **Professional Skills**

Effective professional skills are the cornerstone to successful employment. Students are expected to demonstrate productive professional skills during all phases of enrollment. Faculty will work with students who need assistance in this area to improve the overall possibility for successful employment.

**Attendance:** Attends class for all scheduled hours assigned, arrives/leaves on time, contribute to class discussion and is actively involved in all activities.

**Character:** Displays academic integrity (inclusive of not committing plagiarism), trustworthiness, dependability, reliability, self-discipline, and self-responsibility.

**Teamwork:** Respects the rights of others; is a team worker; is cooperative; ensures confidentiality in all classroom, clinical and other matters; demonstrates professional behavior in interactions with peers, preceptors, and faculty.

**Appearance:** Displays appropriate dress, grooming, hygiene, and wears full regulation uniform of the day.

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

**Productivity:** Follows safety practices; conserves materials and supplies; maintains equipment; stays on task and utilizes time constructively; demonstrates proactive learning through involvement in activities and contributions to class discussions.

**Organization:** Manifests skill in prioritizing and management of time and stress; demonstrates flexibility in handling change; completes assignments on time; uses work time appropriately.

**Communication:** Contacts faculty to report concerns; notifies faculty of tardy/absence one hour before start of class; seeks clarification and understanding through appropriate, pertinent questions.

**Leadership:** Displays leadership skills; appropriately handles conflict and concerns; demonstrates problem-solving capability; maintains appropriate relationships with supervisors/faculty and peers; follows the chain of command.

**Respect:** Deals appropriately with cultural/racial diversity; does not engage in harassment of any kind to include but not limited to verbal, nonverbal, and written; addresses faculty and peers in appropriate tone and with appropriate language to include but not limited to electronic (email, text, etc.) communications.

## **STUDENT DRESS CODE**

Students who attend Lake Tech shall dress in a manner appropriate for the job in which they are receiving training, including any special protective gear and professional uniforms. All clothing, makeup, and jewelry must be clean, neat, modest, in good repair, appropriately sized, and be neither distracting nor offensive. Students are expected to display their valid student ID, or have on their person when unable to display due to safety in the program, at all times.

The Executive Director or designee has the final authority for determining whether or not a student's apparel conforms to the dress code. If it is determined that it does not, students will be required to change into clothing which will conform to this code or leave campus. Students may return to campus when they have changed into appropriate clothing.

Students will wear the designated program uniform each day to class and while on a Job Shadow experience, Co-op or clinical assignment. Shirts may be worn with pants or skirts. Shorts are not permitted. On designated days, some programs will require students to dress in business attire suitable for a job interview. This is defined to be clothing that would be acceptable for most job candidates to wear to a standard job interview.

**NOTE** - Remember that you are preparing for employment in a position in which public relations may be a factor in your success. Individual desires cannot always take precedence.

## GENERAL SCHOOL INFORMATION

### **Campus Safety**

Lake Technical College makes every effort to provide a safe environment for all students, visitors, faculty and staff. Basic safety standards, which will include fire drills, weather drills, equipment usage, and traffic regulations, will be covered in the program orientation. These basic safety standards will be reinforced throughout the program enrollment. See the current school catalog for additional campus safety information.

### **Follow Up**

Lake Technical College is proud of its graduates and celebrates the next step graduates take whether it is employment, military or further education. Prior to completing, students may visit the Career Success Center for assistance with employability skills such as resume writing. In addition, faculty may provide students with employment leads. However, it is up to the individual student to actively pursue employment opportunities. We like to hear how our graduates are doing and want to celebrate your successes so be sure to communicate with your faculty any employment, military, or further education you enter. Students are required to participate in an Exit Interview prior to their last day in their program.

### **Food and Drink**

To protect equipment and furnishings in the classroom and laboratory areas, only water, in closed, covered containers, is permitted. No other food or drinks are allowed, unless specific permission is granted by the faculty. However, under no circumstance may food or drinks be in the computer lab areas.

### **Lunch**

Food services are provided on the main campus in the Lake Tech Café and are available during breaks and lunch. Adult students may leave the LTC campus during the scheduled 30-minute lunch break as long as they return to the program on time.

### **Parking Regulations**

Students may park only in the south parking lot in spaces not designated as staff or customer service parking. For safety, loitering in or around vehicles once the vehicle is parked is not allowed, and a 5 mph speed limit is enforced. In consideration of the neighbors and classes in session, loud music in vehicles on campus is prohibited.

### **Smoking**

Lake Tech is a tobacco free institution. The use of tobacco products of any kind, including e-cigarettes, is not permitted at any Lake Tech location. This includes the parking lots.

## FINANCIAL AID

Policies and guidelines for the administration of all financial aid are established according to federal and state law. Applicants complete an information form, Free Application for Federal Student Aid, and furnish documentation needed to verify eligibility. More information on the application process may be obtained in the Financial Aid Office.

The Financial Aid Office will assist students, where possible, with access to financial support offered by federal agencies (U.S. Department of Education – Pell Grants, Department of Veterans' Affairs), other state and local agencies and local organizations (scholarships).

## TEXTBOOKS

For the most recent book list for any program visit Lake Technical College's bookstore located in the Business Office.



# LAKE TECHNICAL COLLEGE

## Heating, Ventilation, Air-Conditioning/Refrigeration (HVAC/R) 1

### INTRODUCTION

The Heating, Ventilation, Air-Conditioning/Refrigeration (HVAC/R) 1 Program is 750 hours, responsible for training individuals to attain an entry-level status 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. 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 math and in general with an emphasis on **basic** geometry and measuring. These areas are taught as part of the program of study, but it would be helpful to have these skills in advance.

Materials used are self-paced which allow students to progress at their own pace under the supervision of the faculty. Competencies in each area are completed after both written and performance testing.

This program requires basic skills exit scores of Reading/Language 9 and Math 10.

### PROGRAM MISSION

The mission of the HVAC/R Technology Program is to prepare students for employment as a HVAC/R mechanic or installer 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 faculty and program advisory committee to keep current with technological changes.

### ESSENTIAL TRAINING TASKS

#### Physical Requirements

Ability to:

1. Maintain a high degree of manual dexterity
2. Stoop
3. Kneel
4. Lift at least 50 pounds and walk with it
5. Use voice, hearing, and sight effectively to perform jobs in the HVAC/R field
6. Crouch or bend
7. High degree of finger dexterity
8. Crawl
9. Differentiate colors
10. Handle and finger supplies
11. Use depth perception
12. Work in an atmosphere of loud noise
13. Work in an atmosphere of changes in temperature
14. Perform repetitive tasks
15. Measure accurately
16. Work without close, direct supervision
17. Work on multiple tasks and priorities
18. Perform and complete tasks of relative complexity
19. Possess a valid Driver's License

#### Mental and Emotional Requirements

Ability to:

1. Handle confrontation and frustration and assist in problem resolution
2. Interpret a variety of instructions furnished in written, oral, and diagrammatic form
3. Work with others
4. Cope with high levels of stress
5. Perform mathematical computations at a level of tenth grade or higher
6. Make fast decisions under pressure
7. Cope with anger, fear, and hostility of others in a calm manner
8. Demonstrate a high degree of patience
9. Read and understand computer and related equipment
10. Work in close or crowded areas

## MATERIALS

Uniform shirts, Safety goggles (no tinting), Textbooks, and kit

## CLASS SCHEDULE

Full-time students attend class from 7:45 AM to 3:45 PM Monday through Thursday with a 30 minute lunch period. This schedule provides 7.5 hours of instruction each day for a total of 30 hours per four-day week, excluding holidays and school breaks as outlined in the current school calendar.

## CLASSROOM/LAB PROCEDURES

The Heating, Ventilation, Air-Conditioning/Refrigeration (HVAC/R) curriculum at Lake Technical College is designed as an open-entry, individualized, competency-based method of instruction. With this instruction method, a qualified student may enter the program at any time during the school year. The student proceeds through the prepared curriculum individually and at the student's own pace, within the limits set by the program faculty. The faculty follows the student's progress, making suggestions, as required, so the individual will gain the knowledge and experience in a minimum of time. The student must successfully complete all of the competency requirements of the program to receive a graduation certificate.

### Teaching Methods

With open-entry/open-exit, competency-based instruction, the students typically consists of individuals at various levels of progress through the curriculum. For this reason, a minimum of formal classroom instruction time is used in the learning process. Students proceed at their own pace with written, audio-visual, and hands-on training. They are tested periodically with written and practical testing.

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. Teaching aids utilizing digital presentations, DVDs, etc., are used to a great extent throughout all instruction. 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 multimeters, 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. Students are made responsible for all laboratory requirements such as maintaining tools, equipment, and facilities, writing repair orders, tool room management, and cleanup of shop areas.

### Evaluation

Oral and/or written tests during and at the end of each unit or competency are administered with checklists relating to projects and tasks.

The faculty observes and evaluates all shop projects. Whenever possible, criterion reference models and/or checklists are used to evaluate shop performance.

On a progress chart major skills (competencies) are listed for each student. As a competency is correctly mastered by the student, it is initialed by the faculty and graded.

## GRADING PROCEDURE

Student grades are determined through the following percentages:

1. Skills (hands-on) 33 1/3 percent
2. Knowledge 33 1/3 percent
3. Professional Skills 33 1/3 percent

### Skills - Student Performance Objectives

One-third of the grade is based on hands-on skills, as determined by the student performance objectives. Student performance objectives are based on criteria that have been identified for each of the competencies listed in the Florida Curriculum Frameworks and Student Performance Standards (attached). Students are given an overall rating for the competency. Students must achieve an 80% or better on each skills area.

The ratings are as follows:

- 5 The student can perform this skill without supervision and with initiative and adaptability to problem situations.
- 4 The student can perform this skill satisfactorily without assistance or supervision.
- 3 The student can perform this skill satisfactorily but requires some assistance and/or supervision.
- 2 The student can perform parts of this skill satisfactorily, but requires considerable assistance and/or supervision.
- 1 The student cannot perform this skill even with constant supervision.

Students who score below a three (3) on the Performance Test will have the opportunity to repeat the learning activities, practice the preparation again and retake the Performance Test.

### **Knowledge**

One-third of the grade is based on written tests. The faculty will give knowledge tests at the completion of a module. The tests will be on the material covered. Students must achieve a 80% or better on each test. Students are given the opportunity to re-study and re-take the knowledge test if necessary.

### **Professional Skills**

Effective professional skills are the cornerstone to successful employment. Students are expected to demonstrate productive professional skills during all phases of enrollment. Faculty will work with students who need assistance in this area to improve the overall possibility for successful employment. Students must achieve an 80% overall in this area. One-third of the grade is based on the Professional Skills Assessment Form, which includes:

#### **STUDENT DRESS CODE FOR SAFETY**

1. Pants shall be worn fastened and at the waist. Pants should be straight legged or boot cut (jeans are acceptable). Baggy pants are not permitted in any program area. Baggy pants are considered to be more than one size larger than the individual's waist.
2. Shoes must meet safety/industry standards. Open toed shoes are not permitted.
3. Program logo school T-shirts are to be worn.
4. For safety reasons, shorts, loose clothing, jewelry, and loose hair below the collar are not allowed.

Remember: students at this college are preparing for employment in positions where public relations are often a major factor. Individual desires may not always take precedence.

#### **COURSE PREPARATION**

The purpose of this program is to prepare students for employment or advanced training in the heating, air-conditioning (A/C), and refrigeration and ventilation industry. This program prepares students for employment as A/C, Refrigeration and Heating Helper, A/C, Refrigeration and Heating Mechanic Assistant, A/C, Refrigeration and Heating Mechanic, A/C, Refrigeration and Heating Technician, and Refrigeration Technician (SOC 49-9021).

The student should obtain EPA certification prior to leaving school in order to be employed in any job that requires work with refrigerants.

This program focuses on broad, transferable skills, stresses the understanding of the heating, air-conditioning, refrigeration and ventilation industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, the underlying principles of technology, and health, safety, and environmental issues.

#### **PROGRAM OBJECTIVES**

See the attached Florida State Department of Education curriculum framework for program objectives and desired competencies.

**Florida Department of Education  
Curriculum Framework**

**Program Title:** Heating, Ventilation, Air-Conditioning/Refrigeration (HVAC/R) 1  
**Program Type:** Career Preparatory  
**Career Cluster:** Architecture and Construction

Career Certificate Program	
Program Number	C400410
CIP Number	0615050111
Grade Level	30, 31
Standard Length	750 Hours
Teacher Certification	Refer to the <b><u>Program Structure</u></b> section.
CTSO	SkillsUSA
SOC Codes (all applicable)	49-9021 - Heating, Air Conditioning, and Refrigeration Mechanics and Installers
CTE Program Resources	<a href="http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml">http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml</a>
Basic Skills Level	Mathematics: 10   Communications (Reading and Language Arts): 9

### **Purpose**

The purpose of this program is to prepare students for employment or advanced training in the heating, ventilation, air-conditioning/refrigeration (HVAC/R) industry. The student should obtain EPA certification prior to leaving school in order to be employed in any job that requires work with refrigerants. This program focuses on broad, transferable skills, stresses the understanding of the heating, air-conditioning, refrigeration and ventilation industry and demonstrates elements of the industry such as planning, management, finance, technical and production skills, the underlying principles of technology, and health, safety and environmental issues.

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Architecture and Construction career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Architecture and Construction career cluster.

The content includes but is not limited to designing, testing and repairing heating, ventilation, air-conditioning and cooling (HVAC) systems.

**Additional Information** relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

### **Program Structure**

This program is a planned sequence of instruction consisting of three occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

To teach the courses listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the postsecondary program structure:

OCP	Course Number	Course Title	Teacher Certification	Length	SOC Code
A	ACR0000	Introduction to HVAC/R	AC HEAT ME @7 G REFRG MECH 7 G	250 Hours	49-9021
B	ACR0001	HVAC/R Fundamentals		250 Hours	49-9021
C	ACR0012	HVAC/R Service Practices		250 Hours	49-9021

### **Common Career Technical Core – Career Ready Practices**

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

### **Standards**

After successfully completing this program, the student will be able to perform the following:

- 01.0 Demonstrate the importance of health, safety and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 02.0 Explain the importance of employability, soft skills, entrepreneurship skills and making career plans.
- 03.0 Identify, use and maintain the tools and tool accessories used in the heating, air-conditioning and refrigeration industry.
- 04.0 Demonstrate mathematics knowledge and skills.
- 05.0 Explain the properties of matter and heat behavior.
- 06.0 Describe the history and concepts of heating, air-conditioning and refrigeration.
- 07.0 Analyze fluids, pressures, refrigerants and related codes.
- 08.0 Evaluate heating, air-conditioning and refrigeration system components and accessories.
- 09.0 Fabricate and service the piping, tubing and fittings used in the heating, air-conditioning & refrigeration industry.
- 10.0 Utilize and operate mechanical refrigeration servicing and testing equipment.
- 11.0 Demonstrate a practical knowledge of basic electricity and of the electrical components of heating, air-conditioning and refrigeration equipment.
- 12.0 Demonstrate knowledge of electrical wiring in air-conditioning and refrigeration.
- 13.0 Troubleshoot heating, air-conditioning and refrigeration electrical control systems and their components.
- 14.0 Select and test electrical generation and distribution components for commercial heating and air conditioning systems.
- 15.0 Maintain, test and troubleshoot electrical motors and their components for commercial heating and air-conditioning systems.
- 16.0 Utilize mechanical components of heating air-conditioning and refrigeration systems.
- 17.0 Operate solid-state electronics as used in heating, air-conditioning and refrigeration systems.
- 18.0 Read construction documents.
- 19.0 Assist in the installation of a residential heating and air-conditioning system and determine start-up procedures.
- 20.0 Conduct start-up and check-out procedures for mechanical heating and air-conditioning systems.
- 21.0 Use combustion-type heating servicing and testing equipment.
- 22.0 Troubleshoot combustion gas valves and regulators as used in heating, air-conditioning, refrigeration and ventilation systems.
- 23.0 Understand the design of heating and cooling systems.
- 24.0 (Optional) Explain the importance of employability, soft skills, entrepreneurship skills and making career plans.