



REQUEST AND RECOMMENDATION

ONE YEAR OPTION

600- 899 Clock Hour Programs – Heating, Ventilation, and Air Conditioning (HVAC)

Background:

To provide another option for adult students to apply prior learning toward a degree, Ohio legislators established what has come to be known as the One-Year-Option through Section 363.120 House Bill 59 of the 130th General Assembly. The Chancellor of the Ohio Department of Higher Education, in consultation with the Superintendent of Public Instruction and the Governor's Office of Workforce Transformation, was tasked to establish a One-Year Option credit articulation system in which graduates of Ohio's adult career-technical institutions who complete a 900-hour program of study AND obtain an industry-recognized credential approved by the Chancellor will be able to receive 30 technical semester credit hours toward a technical degree upon enrollment in a public institution of higher education. The Chancellor was also to recommend a process to award proportional semester credit hours for adult career-technical institution students who complete a program of study between 600 and 899 hours AND obtain an industry-recognized credential approved by the Chancellor. The Chancellor convened a broad group of stakeholders to develop a system of articulation for the One Year Option that was presented in a report to the legislature called, *"Getting to 30: Establishing a One Year Option Credit Articulation System for Ohio."*

In order to implement the system of articulation developed with the stakeholders as well as address accreditation requirements for degree granting institutions, the Chancellor convened Credit Affirmation Teams (CATs) to conduct a peer review of programs and certifications for affirmation for a block of 30 semester hours of technical credit. The CATs were comprised of faculty and administrators from Ohio Technical Centers (OTCs) and an equal number from public degree granting colleges and universities in Ohio. The CATs were organized by four discipline clusters: Health and Allied Health, Building and Industrial Technology, Business and Information Technology, and Services. They were charged with reviewing the certifications and, if necessary, program content, to affirm that students completing the selected program at an Ohio Technical Center and earned approved certifications had demonstrated competencies equivalent to technical credit. CATs affirmed that programs over 900 hours, articulated to a block of 30 technical credit hours. For programs between 600-899 credit hours, the review resulted in a proportional amount of credit hours being awarded. This technical credit would then be granted, as a block, upon enrollment in a degree granting institution. Additional subject matter experts were consulted when core team members did not have sufficient content knowledge of the program being reviewed.

Recommendation

As detailed in the attached template, the Building and Industrial Technology Credit Affirmation Team recommends that students will be eligible for a block of 20 semester hours of technical credit towards an *Associate of Technical Studies in Building and Industrial Technology* when:

- the student has successfully completed a 600-899 clock hour program in Heating, Ventilation, and Air Conditioning (HVAC) at an Ohio Technical Center.

And currently meets requirements for one of the following pathways:

Pathway 1:

- NCCER Core
- NCCER HVAC Level 1
- NCCER HVAC Level 2
- EPA 608 Universal Certificate
- OSHA 10- General Industry

Pathway 2:

- HVAC Excellence: Employment Ready: Core Competencies
- HVAC Excellence: Employment Ready: Electrical
- HVAC Excellence: Employment Ready: Air Conditioning
- HVAC Excellence: Employment Ready: Gas Heat
- EPA 608 Universal
- OSHA 10 General Industry

Pathway 3:

- NATE Core
- NATE Specialty Exam: Air Conditioning
- NATE Specialty Exam: Gas Furnace
- EPA 608 Universal Certificate
- OSHA 10- General Industry

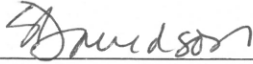
Please note these certifications must be current and valid. Student must have completed the Ohio Technical Center program within 5 years.

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End of Comment Period: May 24, 2017 at 3:30 PM
No comments received, recommend approval

RECOMMENDATION

The Vice Chancellor has verified that this institution has met the standards and requirements of the Ohio Department of Higher Education.



Stephanie Davidson, Vice Chancellor of Academic Affairs

5/31/17

Date

APPROVAL



John Carey, Chancellor

6/8/17

Date

mlc

One-Year Option
Certification Affirmation Template

The Program Affirmation Template is designed to provide a common matrix for a peer review process acceptable to the Higher Learning Commission to soundly affirm awarding technical credit for Ohio Technical Center graduates who are eligible for the One Year Option. The template should be completed for every program/subject and signed by the co-chairs of each of the four-cluster program areas for every Industry-recognized credential and program reviewed.

Please note: All Ohio Technical Centers must be accredited by one of the following: [Council on Occupational Education \(COE\)](#) and/or [Accrediting Commission of Career Schools and Colleges \(ACCSC\)](#).

Program Name: Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Technician	Cluster ☐ Business & Information Technologies ☐ Health/Allied Health ☒ Industrial Trades ☐ Service Industries & Agriculture	
CIP Code: 47.0201		
CIP CODE PROGRAM DEFINITION		
A program that prepares individuals to apply technical knowledge and skills to repair, install, service and maintain the operating condition of heating, air conditioning, and refrigeration systems. Includes instruction in diagnostic techniques, the use of testing equipment and the principles of mechanics, electricity, and electronics as they relate to the repair of heating, air conditioning and refrigeration systems.		
STEP ONE: CREDENTIAL REVIEW: PATHWAY I		
	Details/Explanation	Comments
Primary Industry Credential (if there are competing certifications complete page multiple times)	Name: The National Center for Construction Education and Research (NCCER) Certifications Type: ☐ License ☐ Registry ☒ Certification	- NCCER Core - NCCER HVAC Level 1 - NCCER HVAC Level 2
Program requirements by credentialing body.	The program must be a NCCER Accredited Training Sponsor (ATS) and a NCCER Accredited Assessment Center. "Entities that have been approved by NCCER as having the resources to effectively conduct a quality training program that utilizes NCCER curriculum are designated as an ATS. Entities that have been approved by NCCER as having the resources to effectively conduct a quality assessment program that utilizes the National	About the Exams: NCCER offers a complete series of entry- and journey-level written assessments as part of its National Craft Assessment and Certification Program (NCACP). These assessments evaluate the knowledge of an individual in a specific craft area and provide a prescription for upgrade training when

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	Craft Assessment and Certification Program (NCACP) assessments and performance verifications are designated as an NCCER Accredited Assessment Center. NCCER's accreditation process assures that students and craft professionals receive quality training based on uniform standards and criteria. Training Sponsors and Assessment Centers are subject to audit on a three year cycle." For more information, please see: http://www.nccer.org/assessments-performance-verifications?mID=616	needed. All assessments are based upon the NCCER Curriculum and have been developed in conjunction with Subject Matter Experts from the industry and Prov™, NCCER's test development partner. Module assessments consist of knowledge verification via the successful completion of a written assessment. In addition to the knowledge verification, some modules also require successful completion of a practical performance in the laboratory setting. Renewal: NCCER does not have a renewal option. Exam Integrity: NCCER, through their testing partner Prov, administers training module exams through a secure web-based platform, the Testing Management System. Module tests are created, launched, scored and electronically stored. Instructors and proctors are certified to NCCER requirements.
Instructional hours	NCCER Core required instructional hours: 72.5 NCCER HVAC 1 required instructional hours: 102.5 NCCER HVAC 2 required instruction hours: 175 All NCCER Core, HVAC 1 and HVAC 2 competencies must be covered. Remaining 250-549 hours may vary per program based on local advisory business/industry committees.	350 clock hours of instruction to complete NCCER Curriculum requirements.
Competencies demonstrated by credential attainment.	NCCER Core Competencies: • Basic Safety • Introduction to Construction Math • Introduction to Hand Tools • Introduction to Power Tools • Introduction to Construction Drawings • Basic Rigging (Elective) • Basic Communication Skills • Basic Employability Skills • Introduction to Materials Handling	Each equipment specific module typically contains operation, controls, maintenance, and safety guidelines. NCCER Core http://www.nccer.org/uploads/fileLibrary/Core_2009_courseplanning816201351231PM63.pdf NCCER HVAC Level 1 http://www.nccer.org/uploads/fileLibrary/HVAC_L1

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	NCCER HVAC Level 1 Competencies: • Trade Mathematics • Basic Electricity • Intro to Heating • Intro to Cooling • Intro to Air Distribution Systems • Basic Copper and Plastic Piping Practices • Soldering and Brazing • Basic Carbon Steel Piping Practices NCCER HVAC Level 2 Competencies • Alternating Current • Basic Electronics • Compressors • Refrigerants and Oils • Leak Detection, Evacuation, Recovery and Charging • Metering Devices • Heat Pumps • Basic Maintenance • Chimneys, Vents, Flues • Sheet Metal Duct Systems • Fiberglass and Flexible Duct Systems • Commercial Airside Systems • Air Quality Equipment • Introduction to Hydronic Systems	2013 CEPs.pdf NCCER HVAC Level 2 http://www.nccer.org/uploads/fileLibrary/HVAC_L2 CEPs_4th%20Ed.pdf
Rationale:	The Trades and Industry Credit Affirmation Team (CAT) utilized the following process to complete the assessment regarding the number of semester hours that would be awarded at the college level as block credit based on the industry credentials plus 600-899 clock hours earned at an Ohio Technical Center (OTC). • Research the competencies tested by the industry credential(s). The Trades and Industry Credit Affirmation Team (CAT) reviewed information about the industry credential(s) to determine the competencies signaled by earning the credential(s). • Complete a nationwide internet search to review how other accredited colleges and universities are applying credit to NCCER Core, HVAC 1 and HVAC 2. Pima Community College awards 19 college credits towards an Associated of Applied Science degree in Business and Industry Technology to students of NCCER's accredited	

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sponsors who successfully complete NCCER Core, HVAC 1 and HVAC 2 standardized craft training modules and the Pima-approved challenge exam for those modules. In addition, the Kansas Board of Regents has articulated NCCER Core, NCCER HVAC level 1, NCCER HVAC level 2, EPA 608 Universal Licensure and OSHA 10-General Industry for 16 college credit hours. NCCER HVAC 1 and HVAC2 are recognized by NATE (North American Technician Excellence).

- Review the value of local program advisory committee recommendations to meet the local industry needs. The Team concurred that there was value in having lab/practical, internships and/or externships as part of the program to meet local industry/business needs.
- Review OSHA 10-Hour Hazard Recognition Training for General Industry. OSHA 10 includes content essential to general-related work such as fall protection, personal protective equipment, fire prevention and safety, OSHA inspection procedures and more.
- Review EPA 608 Universal Licensure Training. EPA 608 Universal Licensure includes content essential to Clean Air Act, Montreal Protocol, Section 608 Regulations regarding refrigeration, recovery, leak detection and repair, recharging and safety.

The Trades and Industry CAT confirms:

- The certifications exams are valid, reliable and peer-reviewed on a regular basis to ensure the content accurately measures intended competencies.
- The competencies measured by the NCCER Core, HVAC 1, HVAC 2, OSHA 10 and EPA 608 Universal certificate are developed by industry and reflect industry standards.

The Trades and Industry CAT also considered competencies signaled by lab and practical learning experiences. As part of the program offered by OTCs, student will participate in lab/practical experience as recommended by the local program advisory committee to meet local business and industry needs. The lab/practical experiences will reinforce the instructional competencies through hands-on learning.

Upon successful completion of the 600-899 hour program in the field of HVAC at an Ohio Technical Center and attainment of the following certifications:

- NCCER Core
- NCCER HVAC Level 1
- NCCER HVAC Level 2
- OSHA 10- General Industry
- EPA 608 Universal Certificate

A student shall be awarded 20 technical semester hours towards completion of an Association of Technical Studies at a public degree granting college or university.

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-OR-

Program Name: Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Technician CIP Code: 47.0201	Cluster ☐ Business & Information Technologies ☒ Health/Allied Health ☒ Industrial Trades ☒ Service Industries & Agriculture	
STEP ONE: CREDENTIAL REVIEW: PATHWAY 2		
	Details/Explanation	Comments
Primary Industry Credential (if there are competing certifications complete page multiple times)	Name: HVAC Excellence: Employment Ready Certifications Type: ☐ License ☐ Registry ☒ Certification	HVAC Excellence: Employment Ready Certifications - Core Competencies - Electrical - Air Conditioning - Gas Heat
Program requirements by credentialing body.	All standards (Codes, specification, recommend practices, methods, classifications and guides) of the ESCO HVAC Excellence have developed to meet Federal, State and institutional requirements. Each HVAC Excellence: Employment Ready Certification is a “stand alone” certificate. These discipline specific exams helps to evaluate student achievement creating documentation of a person's retained knowledge necessary for employment in the HVACR industry.	About the Exams: Developed as end-of course exams. Examinations are developed through the input of technical experts, also referred to as "Subject Matter Experts" or SME's. To develop any national test, a minimum of five and a maximum of nine technical experts from three states are essential. Renewal: None Exam Integrity: Content is developed by a “job and task analysis” process within the field of occupation. The SME's develop a table of test specifications which establishes the construct validity and the semantic validity of the assessment. Through the item analysis process, each test question is validated for

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		“reliability.” HVAC Excellence: Employment Ready Certifications http://www.hvacexcellence.org/EmploymentReady.aspx HVAC Excellence Accreditation Manual http://www.hvacexcellence.org/Documents/AccreditationManual/index.html#26/z
Hour Requirements (includes any instructional, lab/practice hours, or internship hours).	All HVAC Excellence: Core Competencies, Electrical, Air Conditioning, Gas Heat competencies must be covered.	
Competencies demonstrated by credential attainment.	The following end-of-course examinations are required to verify the students’ knowledge in a 600-899 clock hour OTC program. HVAC Excellence: Employment Ready Competencies Core Competencies • Converting fractions to decimals and decimals to fractions • Calculating squares, cubes, and roots • Solving equations • Calculating ΔT • Converting English measurements to metric measurements • Ratios and proportions as they relate to various equipment and components such as: compressors and pumps, pulleys, drive systems, fans • Calculate duct sizing using duct sizing formulas • Calculate a residential structure heat loss and gain • Differentiate between Renewable and Sustainable energy • Define the following acronyms: BIM, CBECS, ECM, EIA • Describe an energy audit • Describe a Life Cycle cost Analysis	Minimum Tasks and Competencies for HVAC Excellence Accredited Programs http://www.hvacexcellence.org/EmploymentReady.aspx Exam Development http://www.hvacexcellence.org/ExamDevelopment.aspx

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- Define: EER, SEER, AFUE, HSPF, COP, ECM
- Define psychometrics fundamentals
- Explain the thermodynamics of air and water vapor
- Explain the water vapor cycle in the Earth's atmosphere
- Define standard air volume and density
- Identify each line on the psychometric chart and explain the properties
- Plot any two basic points on and psychometric chart and evaluate the data
- Explain the comfort zone and the different temperatures and relative humidity's effect on human comfort.
- Describe the eight process of air conditioning and how to plot each on a psychometric chart
- Define and use the Process Triangle on the psychometric chart to calculate, sensible heat, latent heat and total heat.
- Explain sensible heat ratios
- Calculate mixed air problems for infiltration and ventilation
- Develop critical thinking skills including analysis, evaluation, calculations and the use of the computer technology.

Electrical

- Define the structure of an atom
- Describe the difference between positive and negative charged atoms
- Describe potential difference
- Describe current flow
- Describe Ohm's Law and solve problems applying Ohm's Law
- Describe and demonstrate the effects of voltage drop in a series circuit
- Calculate and measure the voltage output of a transformer using the number of turns on the primary vs. the secondary sides
- Define impedance

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- Define and identify conductors
- Describe and identify insulators
- Define and identify semi-conductors
- Identify the types and describe the proper application and use of “Circuit Protectors”
- Identify, describe, and explain the function and application of: Contactors , Loads, switches, Line starters, Solenoid valves, Defrost timers, Transformers, Thermostats, Positive temperature coefficient thermistors, Heat anticipators, Negative temperature coefficient thermistor Relays
- Describe how capacitors are rated and tested
- Describe how overload protectors function
- Evaluate, replace and describe the function, application and wiring of a start capacitor
- Evaluate, replace and describe the function, application and wiring of a run capacitor
- Describe and explain motor speed
- Explain and change the direction of rotation in a single phase motor
- Describe a three phase motor
- Explain the difference between a Wye and Delta three phase motor
- Describe a dual voltage three phase motor
- Describe a permanent split capacitor motor, capacitor start induction run motor, and a multi speed motor
- Describe the operation and characteristics of an Electronically Commutated Motor (ECM)
- Describe the difference between a “Pictorial”, a “Ladder Diagram”, and a “Schematic”
- Identify electrical symbols used in HVACR schematics
- Identify inoperative/defective component using schematic wiring diagrams
- Identify voltage between two points using schematic wiring diagrams

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- Determine sequence of operation using schematic wiring diagrams

Air Conditioning:

- Define enthalpy and entropy
- Explain condensation of a vapor, and its effect on heat
- Explain vaporization of a liquid, and its effect on heat
- Describe change of state
- Define vacuum as it is used in the HVACR industry
- Describe the following oils and their applications; Mineral, Alkylbenzene, Glycols, and Esters
- Describe the thermodynamics of refrigerants
- Identify and define the following types of blends; Binary, Ternary, Azeotropic, and Near Azeotropic
- Identify and define; CFC's, HCFC's, and HFC's
- Describe fractionation and its causes
- Describe temperature glide
- Define and demonstrate refrigerant recovery
- Define and demonstrate refrigerant recycling
- Define reclaim
- Describe the six types of leak detectors
- Explain the method for pinpointing a leak.
- Explain the proper use of each type of leak detector and their applicability.
- Explain the proper use and handling of nitrogen in the leak detection process
- Describe the principles of dehumidification and humidification.
- Describe and define the following; BTU, latent heat, sensible heat,
- Describe and define the following; subcooled liquid, superheated vapor.
- Describe and define the following; wet bulb temperature, dry bulb temperature, and dew point.

Gas Heat

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	• Define BTU • Define AFUE • Define and differentiate between primary air and excess air. • Describe and state the causes of burner “Flashback” • Describe and state the causes of a lifting flame. • State the maximum percentage of Carbon Dioxide produced by the perfect combustion of natural gas • State the maximum percentage of Carbon Dioxide produced by the perfect combustion of propane gas • State the reason for appropriate polarity wiring on solid state circuits • State the generally accepted standard gas manifold pressure for a residential furnace • State the formula for sensible heat.	
Rationale:	The Trades and Industry Credit Affirmation Team (CAT) utilized the following process to complete the assessment regarding the number of semester hours that would be awarded at the college level as block credit based on industry credential(s) plus 600-899 clock hours earned at an Ohio Technical Center (OTC). • Research the competencies tested by the industry credential(s). The Trades and Industry Credit Affirmation Team (CAT) reviewed information about the industry credential(s) to determine the competencies signaled by earning the credential(s). • Complete a nationwide internet search to review how other accredited colleges and universities are applying credit to HVAC Excellence: Employment Ready Certifications. Hillyard Technical College has an articulation agreement with North Central Missouri College for 30 semester hours towards an Associate of Applied Science in Applied Technology (1 + 1 Program) who successfully complete all 7 HVAC Excellence Exams. In addition, there is an articulation agreement between the HVAC Excellence Exams and the Local Union of United Association of Journeymen and Apprenticeship of the Plumbing and Pipe Fitters Industry for credit towards the first year of the apprenticeship program for individuals who successfully complete all 7 HVAC Excellence Exams. In addition, the Kansas Board of Regents has articulated the HVAC Excellence Exams Core, Air Conditioning, Gas Heat, Electrical, EPA 608 Universal Licensure and OSHA 10-General Industry for 16 college credit hours. • Review the value of local program advisory committee recommendations to meet the local industry needs. The Team concurred that there was value in having lab/practical, internships and/or externships as part of the program to meet local industry/business needs. • Review OSHA 10-Hour Hazard Recognition Training for the General Industry. OSHA 10 includes content essential to general-related work such as fall protection, personal protective equipment, fire prevention and safety,	

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OSHA inspection procedures and more.

- Review EPA 608 Universal Licensure Training. EPA 608 Universal Licensure includes content essential to Clean Air Act, Montreal Protocol, Section 608 Regulations regarding refrigeration, recovery, leak detection and repair, recharging and safety.

The Trades and Industry CAT confirms:

- The certifications exams are valid, reliable and peer-reviewed on a regular basis to ensure the content accurately measures intended competencies.
- The competencies measured by the HVAC Excellence: Employment Ready Certifications in the areas of Core Competencies, Electrical, Air Conditioning, Gas Heat, EPA 608 Universal and OSHA 10 General Industry are developed by industry and reflect industry standards.

The Trades and Industry CAT also considered competencies signaled by lab and practical learning experiences. As part of the program offered by OTCs, student will participate in lab/practical experience as recommended by the local program advisory committee to meet local business and industry needs. The lab/practical experiences will reinforce the instructional competencies through hands-on learning.

Upon successful completion of a 600-899 hour program in HVAC and attainment of the following certifications:

- HVAC Excellence: Employment Ready: Core Competencies
- HVAC Excellence: Employment Ready: Electrical
- HVAC Excellence: Employment Ready: Air Conditioning
- HVAC Excellence: Employment Ready: Gas Heat
- EPA 608 Universal
- OSHA 10 General Industry

A student shall be awarded 20 technical semester hours to be applied towards completion of an Association of Technical Studies at a public degree granting college or university.

-OR-

Program Name:

Heating, Ventilation, Air
Conditioning and
Refrigeration
Engineering Technology/

Cluster

- ☐ Business & Information Technologies
- ☐ Health/Allied Health
- ☒ Industrial Trades
- ☐ Service Industries & Agriculture

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Certification Affirmation Template

Technician		
CIP Code: 47.0201		
STEP ONE: CREDENTIAL REVIEW: PATHWAY 3		
	Details/Explanation	Comments
Primary Industry Credential (if there are competing certifications complete page multiple times)	Name: NATE ICE (KATE's) Certification for Installers Type: ☐ License ☐ Registry ☒ Certification	- NATE Core - NATE Specialty Exam: Air Conditioning - NATE Specialty Exam: Gas Furnace
Program requirements by credentialing body.	NATE exams are based on Knowledge Areas Of Technician Expertise (KATEs). The KATEs divide the certification process into tests for installation, service and senior-level technicians. The tests recognize different levels of experience and knowledge. NATE KATEs are statistically proven job task analysis from experts in the HVACR industry. KATEs represent a wide variety of perspectives on subject matter pertinent to contractors, technicians, distributors, educators, manufacturers and utilities. There are no educational or work experience requirements, yet NATE strongly recommends individuals have some formal training provided by an employer, a technical school or other educational institution before taking relevant NATE exams. NATE suggest: - One year of experience or vocational training for installation technician tests - Two years of experience for service technician tests - Five years of experience for senior level technician	About the Exams: The NATE Technical Committee oversees the Knowledge Areas of Technician Expertise (KATEs) and all test development. The KATEs are the statistically proven job task analysis from which all questions are developed. All exams are developed by subject matter experts from across the HVAC/R industry representing a wide variety of perspectives which includes contractors, technicians, distributors, educators, manufacturers, and utilities. Renewal: Prior to January 2014, individuals must recertify every 5 years plus provide evidence of 60 continuing education hours. After January 2014, individuals must recertify every 2 years plus provide evidence of 16 continuing education hours. Exam Integrity: The NATE Technical Committee, comprised of industry experts nationwide, oversees the Knowledge Areas of Technician Expertise (KATEs) and all test development. KATEs are statistically proven job task analysis from which all questions are developed.

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Hour Requirements (includes any instructional, lab/practice hours, or internship hours).	All NATE Core, Air Conditioning, Gas Furnace competencies must be covered.	
Competencies demonstrated by credential attainment.	The following end-of-course examinations are required to verify the students' knowledge in a 600- 899 clock hour OTC program. NATE: KATE/ICE Competencies The Core exam tests a candidate's general knowledge, construction knowledge, and HVACR specific knowledge in the areas of: • Safety • Tools • Basic Construction • Using Basic Science • Achieving Desired Conditions • Taking Temperature and Humidity Measurements • Basic Electrical Specialty Section: Air Conditioning The Air Condition exam tests a candidate's general knowledge, construction knowledge and HVACR specific knowledge in the areas of: • Fabricating copper tubing • Refrigerant Line Installation • Bending copper tubing • Copper tubing preparation • Brazing • Flare Fittings • Brazing and Soldering Equipment • Installing condensing unit • Installing connecting condensing unit • Installing packaged units • Installing indoor equipment • Installation of indoor air handlers and furnaces	ICE: Core Exam Competences http://www.natex.org/site/341/Technicians/What-Tests-to-Take/KATEs/Specialty-Tests ICE: Special Section Companies Note: According to NATE website http://www.natex.org/site/341/Technicians/What-Tests-to-Take/KATEs/Specialty-Tests Individuals who pass the Air-to-Air Heat Pump test are also awarded Air Condition Certification Air Condition (Installation) http://www.natex.org/site/341/Technicians/What-Tests-to-Take/KATEs/Specialty-Tests Gas Furnaces (Installation) http://www.natex.org/site/341/Technicians/What-Tests-to-Take/KATEs/Specialty-Tests

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Specialty Section: Gas Furnace

- Selecting gas furnace sites
- Mounting furnaces
- Connecting Utilities
- Installation of metal venting systems
- Installation of PVC/ABS venting systems
- Installation of condensate drains for condensate furnace
- Duct installation,
- Duct fabrication equipment
- Field construction
- Installing metal duct
- Installing flexible duct
- Installing duct board
- Installing grilles, registers, diffusers and dampers
- Chases used as ducts
- Reconnecting duct when replacing equipment
- Installation of plenums and ducts
- Installing accessories
- Installing thermostats
- Installing humidifiers
- Installing electronic air cleaners
- Installing economizers
- Start-up and check-out procedures
- Leak detection tools
- Airflow measurements
- Airflow velocity measurements
- Airflow pressure measurements
- Airflow volume measurements
- Airflow checks and design tools
- Service diagnostics and start-up repairs
- Introduction to electrical troubleshooting
- Low voltage circuits
- Line voltage circuits
- System components
- Introduction to systems heat transfer

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	• Fundamentals of gas combustion • Furnace configurations and applications • Gas furnaces with split system air conditioner • Multi-position furnace • Packaged gas furnace system • Combustion process for gas furnace systems – Natural gas • Combustion process for gas furnace system – manufactured gas • Fundamentals of gas combustion systems • Natural draft gas furnace operation • Ignition • Venting • Control functions • Combustion air requirements – Direct vent (outdoor air) specifications • Air distribution – duct system • Supply blowers • Wiring layouts • Induced draft non-condensing and non-condensing furnace operation • Applied knowledge: air quality regulations, indoor air quality, electrical code requirements, State and local regulations and codes, fire protection regulations, fire prevention, venting regulations, • Design considerations • Packaged systems • Furnace access and clearances • Gas piping	
Rationale	The Trades and Industry Credit Affirmation Team (CAT) utilized the following process to complete the assessment regarding the number of semester hours that would be awarded at the college level as block credit based on industry credential(s) plus 600-899 clock hours earned at an Ohio Technical Center (OTC). • Research the competencies tested by the industry credential(s). The Trades and Industry credit affirmation team (CAT) reviewed information about the industry credential(s) to determine the competencies signaled by earning the credential(s).	

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- Complete a nationwide internet search to review how other accredited colleges and universities are applying credit to NATE ICE/KATE Exams. The Kansas Board of Regents has articulated NATE ICE Core Competencies, NATE Special Exams: Air Conditioning and Gas Furnace, EPA 608 Universal Licensure and OSHA 10- General Industry for 16 college credit hours.
- Review the value of local program advisory committee recommendations to meet the local industry needs. The Team concurred that there was value in having lab/practical, internships and/or externships as part of the program to meet local industry/business needs.
- Review OSHA 10-Hour Hazard Recognition Training for the General Industry. OSHA 10 includes content essential to general-related work such as fall protection, personal protective equipment, fire prevention and safety, OSHA inspection procedures and more.
- Review EPA 608 Universal Licensure Training. EPA 608 Universal Licensure includes content essential to Clean Air Act, Montreal Protocol, Section 608 Regulations regarding refrigeration, recovery, leak detection and repair, recharging and safety.

The Trades and Industry CAT confirms:

- The certifications exams are valid, reliable and peer-reviewed on a regular basis to ensure the content accurately measures intended competencies.
- The competencies measured by the NATE ICE (KATEs) in the areas of Core Competencies, Special Exams: Air Conditioning and Gas Furnace, EPA 608 Universal and OSHA 10 General Industry are developed by industry and reflect industry standards.

The Trades and Industry CAT also considered competencies signaled by lab and practical learning experiences. As part of the program offered by OTCs, student will participate in lab/practical experience as recommended by the local program advisory committee to meet local business and industry needs. The lab/practical experiences will reinforce the instructional competencies through hands-on learning.

Upon successful completion of the 600-899 hour program and attainment of the following certifications:

- NATE Core
- NATE Specialty Exam: Air Conditioning
- NATE Specialty Exam: Gas Furnace
- EPA 608 Universal
- OSHA 10 General Industry

A student shall be awarded 20 technical semester hours to be applied towards completion of an Association of Technical Studies at a public degree granting college or university.

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ONLY IF NECESSARY TO AFFIRM 20 CREDITS----STEP TWO: PROGRAM-RELATED COMPETENCIES OBTAINED OUTSIDE OF PRIMARY CREDENTIAL

	Details/Explanation	Comments
Additional related complementary credential(s) or badge(s) (e.g. OSHA 10, CPR).	OSHA 10-Hour: General Industry Certification Universal EPA Section 608 Certification (Various Vendors)	
Competencies demonstrated by additional credential attainment.	OSHA 10- Hour: General Industry: Mandatory - 7 hours of training • Introduction to OSHA • Walking and Working Surfaces, including fall protection • Exit Routes, Emergency Action Plans, Fire Prevention Plans, and Fire Protection • Electrical • Personal Protective Equipment • Hazard Communication Elective - 2 hours of Training Must present at least two hours of training on the following topics. At least two topics must be presented. The minimum length of any topic is one-half hour. • Hazardous Materials • Materials Handling • Machine Guarding • Introduction to Industrial Hygiene • Bloodborne Pathogens • Ergonomics • Safety and Health Program • Fall Protection Optional - 1 hour of Training. Teach other general industry hazards or policies and/or expand on the mandatory or elective topics. The minimum length of any topic is one-half hour.	Must be taught by a Certified OSHA Outreach Trainer. https://www.osha.gov/dte/outreach/program_requirements.pdf Elective and Optional components of the OSHA 10-Hour: General Industry Credential will be determined by local program advisory board.

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	Universal EPA Section 608 Certification CORE • Ozone Depletion • Clean Air Act and Montreal Protocol • Section 608 Regulations • Substitute Refrigerants and oils • Refrigeration • Three R's • Recovery Techniques • Dehydration Evacuation • Safety • Shipping TYPE 1 (Small Appliances) • Recovery Requirements • Recovery Techniques • Safety TYPE 2 (High-Pressure) • Leak Detection • Leak Repair Requirements • Recovery Techniques • Recovery Requirements • Refrigeration • Safety TYPE 3 (Low-pressure) • Leak Detection • Leak Repair Requirements • Recovery Techniques • Recharging Techniques • Recovery Requirements • Refrigeration • Safety	Universal Section 608 Certification http://www.epa.gov/ozone/title6/608/technicians/certoutl.html#core
Description of additional program elements		

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beyond primary credential.		
Program related competencies/learning outcomes outside of credential(s). Include how competencies are demonstrated.	.	
Related Programs as of Fall 2016	Ohio Technical Center Ashland County-West Holmes Joint Vocational School District Auburn Career Center Buckeye Career Center Butler Technology & Career Development Schools Knox County Career Center Medina County Career Center Mid-East Career and Technology Centers Penta Career Center JVSD Polaris Career Center Portage Lakes Career Center Upper Valley Career Center Warren County Career Center The Washington County Career Center	Program Name HVAC/R HVAC HVAC/R HVAC HVACR HVAC HVAC HVAC/R HVAC/R HVAC HVAC/R HVAC HVAC/R
		Clock Hours 850 600 600 648 685 600 600 735 600 600 600 600 720
Committee Members and Subject Matter Experts:	Name Barbara Wagner Kelly Zelesnik Jon Buttelwerth Carrie Fife Carl Hilgarth Jeffrey Jones Larraine Kapka Mike Sizemore	Role Co-Chair Co-Chair Member Member Member Member Member Member
		Institution Upper Valley Career Center Lorain County Community College Cincinnati State Technical and Community College Pickaway Ross Career & Technology Center Shawnee State University Ashland County West Holmes Career Center Sinclair Community College Miami Valley Career Technical Center

One-Year Option
Certification Affirmation Template

	Greg Timberlake	Member	North Central State College
Other Parameters of Competency.			
OTHER COMMENTS. Material covered is adequate to allow 20 hours of credit to be granted.			
AFFIRMED NUMBER OF TECHNICAL BLOCK CREDITS	20 Semester Hours		LENGTH OF TIME CREDENTIAL CAN BE USED FOR ONE-YEAR OPTION: Must have completed a 600-899 hour HVAC program at an Ohio Technical Center and meet requirements for one of the pathways as indicated on the cover sheet. The certifications must be current and valid. Must have completed the Ohio Technical Center program within 5 years.
Co-chair signatures:  Dr. Barbara G. A. Wagner, Adult Division Director Upper Valley Career Center – Ohio Technical Center  Kelly A. Zelesnik, Dean of Engineering Technologies Lorain County Community College			
Date: 5/8/17			