



**CAREER AND TECHNICAL EDUCATION**

**The future of career success starts here.**

*Heating, Ventilation  
Air Conditioning & Refrigeration  
16/17*

CTE is a Division of the WSWHE BOCES

CTE COURSE SYLLABUS

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# Heating, Ventilation, Air Conditioning & Refrigeration



<b>Course Description:</b>	A two-year program aligned with the most current HVAC Excellence modules relevant for this geographic area and industry needs/trends. The program integrates shop operations, job planning and estimating, customer service, professionalism, and ethics. The curriculum is enhanced by the Home Performance with the ENERGY STAR Program, which helps students understand how the house works as a system.
<b>Prerequisites:</b>	Basic Electricity
<b>1 Year/2 Years:</b>	2 year (1/2 day), 1 year (full day)
<b>Location:</b>	F. Donald Myers Education Center
<b>Course Objective:</b>	The course is divided between critical thinking, planning, applied communications, applied mathematics, computer skills and soft skills
<b>Course Topic Outline:</b>	Safety and Environment, Hand and Power Tool Operation, Blueprint Reading, Planning and Estimating Jobs, Codes and Requirements, Fork Truck Licensure, Electrical Principles, Electric Motors, Controls, Piping Principles and Practices, Refrigeration Principles and Practices, Universal R-410A Safety and Training, Heating Principles and Practices, Air Conditioning Principles and Practices, Commercial Conditioned-Air Systems, Commercial Refrigeration, Residential Plumbing, Commercial Plumbing, Residential Wiring, Small Appliance Repair, Trade Related Carpentry
<b>Student Course Requirements:</b>	Student must have good attendance and be willing to dedicate themselves to learning as well as appropriate dressware for the trade
<b>Textbooks/Materials</b>	<i>Step by Step Guide to Home Wiring</i> George Lanthier, <i>Combustion and Oil Burning Equipment</i> ESCO, <i>Medium and High Efficiency Gas Furnaces</i> ESCO, <i>Troubleshooting Modern A/C &amp; Refrigeration Systems</i> Goodheart Wilcox, <i>Modern Plumbing</i>
<b>Assessments/Technical Assessments:</b>	HVAC Excellence certification exams in electrical, air conditioning, refrigeration, gas heat and oil heat. Portfolio
<b>Grading System:</b>	Quizzes 15%   Projects 40%   In-Class Assignments 20%   Tests 20%   Homework/Journal 5%
<b>Attendance &amp; Class Participation:</b>	The WSWHE BOCES has an attendance policy that requires students to miss no more than 18 days across the school year. For those times when it is necessary to be absent, a call notifying the guidance office and class is required. A written note from the parent/guardian will be necessary the next class day for the student to re-enter the class.

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<b>Activities/Labs/Projects/Clinics:</b>	50% hands-on, 25% math & ELA integration, 25% lecture/clinics				
<b>Student Provided Material List:</b>	3-ring binder, appropriate dressware for trade				
<b>Industry Certifications:</b>	EPA 608 Refrigeration, Multiple HVAC Excellence Certifications, Fork Truck Licensure, OSHA 10 & 30 hour certificates				
<b>Articulation Agreements:</b>	<p>Each Career and Technical Education (CTE) program is geared to ready students for the world of work and for the rigors of post-secondary coursework. To that end, each program has worked with area colleges to obtain articulation agreements that allow for advance standing or the issuance of credit to those CTE students meeting all program requirements and articulation agreement standards. Our participating colleges are:</p> <ul style="list-style-type: none"><li>› Alfred State College</li><li>› Lincoln Institute of Technology</li><li>› SUNY Canton</li></ul>				
<b>Related Careers/Post-Secondary Training:</b>	Hudson Valley Community College (SUNY Delhi), University of Ohio, Alfred State				
<b>ELA/Math Credit Integrated Academic Overview:</b>	<p>Each Career and Technical Education (CTE) program offered at the WSWHE BOCES has five (5) major curriculum elements that students will acquire over a one year or two year period. Two (2) of the five (5) curriculum elements include English Language Arts and Mathematics. These program elements are taught using a co-teaching model, which teams the CTE subject experts and certified English and Math instructors. Topics in English and Math are tied to specific business and industry course content, which illustrates to students how academic material and business knowledge and skill relate to one another. English and Math elements are taught at the commencement level and meet NYS Standards for students to obtain one (1) credit for each over a two-year period. Program specifics are as follows:</p> <table><tr><td>Commencement Level Math . . . . .</td><td>54 hours/yr</td></tr><tr><td>English Language Arts . . . . .</td><td>54 hours/yr</td></tr></table> <p><i>1 credit = 108 hours</i></p>	Commencement Level Math . . . . .	54 hours/yr	English Language Arts . . . . .	54 hours/yr
Commencement Level Math . . . . .	54 hours/yr				
English Language Arts . . . . .	54 hours/yr				
<b>Career &amp; Financial Management Credit Overview</b>	<p>Each Career and Technical Education (CTE) program offered at the WSWHE BOCES offers a Career &amp; Financial Management credit to all students who successfully complete a CTE program. This curriculum element is comprised of two major parts; (A) Introduction to Occupations and (B) Nature of Industry. Part A is delivered through integrated class assignments, while Part B is automatically delivered due to the nature of CTE.</p>				
<b>NTHS Nominations Requirements:</b>	<ol style="list-style-type: none"><li>1. Maintain a cumulative CTE average of 92% or higher based upon 1st &amp; 2nd quarter grades.</li><li>2. Maintain a record of excellent attendance in CTE (9 days per year).</li><li>3. Plan to pursue a career in their field of training.</li><li>4. Maintain an outstanding record of employability skills as judged by the CTE instructor.</li><li>5. Nomination by the CTE instructor with no reservations.</li><li>6. Instructor nomination must include a yes answer to the following characteristics established by the national office: follows instructions, safety conscious, works well with others, is dependable, trustworthy, responsible, honest, takes pride in work, exhibits a good attitude, exhibits leadership, exhibits good citizenship.</li></ol>				

**Student Affiliated Organization:** › SkillsUSA

**WBL Experiences/ Requirements:** Each Career and Technical Education (CTE) program has a Work-Based Learning experience more commonly referred to as an internship. This means that all students prior to the end of the second year are given the opportunity to be exposed to the operation of a business and specific job duties related to careers in their CTE area. This internship is designed to connect the skills and knowledge learned in the CTE classroom with the real world requirements of a business. Students must demonstrate good attendance, attitude, internship records, and work ethics, as well as respect for others and property.

The Washington-Saratoga-Warren-Hamilton-Essex BOCES does not discriminate in its employment and admission to programs and activities as applicable, on the basis of actual or perceived race, color, creed, sex, sexual orientation, national origin, religion, age, economic status, marital status, veterans' status, political affiliation, domestic victim status, use of a guide dog, hearing dog or service dog, disability, or other classifications protected under federal or state law, and provides equal access to the Boy Scouts and other designated youth groups. The designated district compliance officers will coordinate compliance with the nondiscrimination requirements of Title VI and Title VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, the Americans with Disabilities Act of 1990, as amended, the Boy Scouts of America Equal Access Act, and the New York State Human Rights Law. The BOCES Compliance Officers are: Donna J. Wisenburn, Director of Human Resource Services or Timothy G. Place, Deputy District Superintendent, Washington-Saratoga-Warren-Hamilton-Essex BOCES, 1153 Burgoyne Avenue, Suite 2, Fort Edward, NY 12828, phone (518) 581-3310 or 746-3310. Complaints may also be filed with the Office for Civil Rights, New York Office, U.S. Department of Education, 32 Old Slip, 26th Floor, New York, NY 10005-2500, phone (646) 428-3800, fax (646) 428-3843, email: OCR.NewYork@ed.gov.