Master Course Syllabus

Your College, Your Future

WILLIAMSBURG TECHNICAL COLLEGE

Established 1969

ACR 120
BASIC AIR CONDITIONING

Course Number	ACR 120
Course Title	Basic Air Conditioning
Credit Hours	4
Prerequisites	ACR 101 with grade ≥ C
Course Description	This course is a study of various types of air conditioning equipment, including electrical components schematics and service to the refrigerant circuit.
Course Objectives	The student will pick the correct statement, term or definition concerning each of the following items: compressor, service connections, evaporator, superheat, air handler, sub-cooling, condenser, dew point, condensing unit, receiver, metering device, accumulator, gauge manifold, condensate, and refrigerants. The student will select the correct statement, term or definition concerning each of the following items: power supply, contactor fuses/breakers, relay (fan), transformer, thermostat, staring relays, fan motor, start/run capacitor, air/start, interlock/lock-out relay, and solenoid valve. The student will identify each of the major components listed below: condenser fan, contactor, fan motor, thermostat, condenser, evaporator, compressor, evaporator fan, run capacitor (compressor/fan motor) and slinger fan (if used). The student will describe the function of the following major components of a window air conditioning unit in accordance with information from the required text and handout materials received: condenser, run capacitors, evaporator, control switch, compressor, thermostat, metering device, slinger ring, fan motor and heat exchanger section. Provided with electrical drawings of all necessary components, without the use of any additional reference materials, the student will construct all electrical wiring to complete the circuitry required for the normal design operation of a window air conditioning unit. Given a series of statements describing conditions that may be found by sight, sound, touch or by testing, allowed the use of wiring diagrams and/or component location drawings, furnished with a selection of symptoms that may or may cause a window air conditioning unit to malfunction, the student will identify the correct component that is malfunctioning, repair or replace the component and ensure

Master Course Syllabus

	that the equipment is returned to normal operation. Given an inoperative window air conditioning unit, access to the necessary tools, test equipment, and replacement components, use of wiring diagram, classroom notes and manufacturers' instructions, the student will: A. Use the correct tools and test equipment, identify the inoperative component or components. B. Repair or replace the defective component or components, ensure that unit is in normal operating condition. Provided with electrical drawing of all necessary components, without the use of any additional reference materials, the student will construct all electrical wiring to complete the circuitry required for the normal designed operation of a central air conditioning system (cooling). Provided with a complete central air conditioning cooling system (actual equipment, drawings, or pictures) without the use of any additional reference materials, the student will locate each of the major components listed: condensing unit (split system), transformer, air hander (split system), power supply, thermostat, staring components (if used), suction line (with filter drier if used), contactor, liquid line (with filter drier if used), interlock/lockout relay (if used), condenser fan motor (with capacitor), fan relay, evaporator blower motor (with capacitor) and safety/ protecting devices. Without the use of any additional reference materials, the student will describe the function of the following major components of a central air conditioning system (cooling) in accordance with the required text and or handout material received: condensing unit (split system), metering device, air handler (split system), transformer, thermostat, power supply, suction line (with filter drier if used), starting components (if used), liquid line (with filter drier if used), contactor, condenser fan motor (with capacitor if used), interlock/ lockout relay, evaporator blower motor (with capacitor), fan relay and safety / protecting device (if used). Given a series of statements describing conditions that may be found by sight, sound, touch or by testing, allowed the use of wiring diagrams and/or component location drawings, furnished with a selection of symptoms that may or may not cause a central air conditioning system to malfunction in the cooling mode, the student will identify the correct component that is causing the malfunctioning to occur so that if the component is repaired or replaced the unit would be restored to its design operation. Given an operative central air conditioning unit, access to the necessary tools, test equipment, and replacement components, use of wiring diagrams, classroom notes and manufacturers instruction, the student will: A. Use the correct tools and test equipment to identify the inoperative components. B. Either by repair or replacement of defective components, place the unit in normal designed operation (cooling mode).
Course Developer	Sam Gardner
Means of Instruction	Lecture, Lab
Required Textbook/Written Materials/Supplies	*See online Booklist for current book.*

Master Course Syllabus

General Education Core Competencies

General Education Core Competencies	Course Methodology, Content and/or Assessment
Communication: Students will be able to communicate effectively through reading, writing, speaking and listening. • Prepare written documents in a professional manner. • Develop oral communication skills to present information in a professional and appropriate manner. • Demonstrate appropriate listening skills in one-on-one and small and large group settings.	Participation in class discussions is recommended and encouraged. The class consists of exercises that require the students to complete case scenarios by referring to the appropriate chapter, article, part, and section of the current NEC document. The Instructor will work with each individual student to assure quality workmanship.

General Education Core Competencies	Course Methodology, Content and/or Assessment
Mathematical Reasoning: Students will apply those mathematical skills appropriate to their program of study. • Analyze and solve mathematical problems needed in the workplace, daily life and educational environment. • Interpret data using analytical methods.	Students will be able to calculate circuit values. Students will use appropriate NEC tables and formulas to calculate various electrical installation requirements.
Critical Thinking: Students will employ effective processes for resolving problems and making decisions. • Identify problems and potential causes. • Solve problems using basic research, analysis and interpretation. • Evaluate results of solutions and revise strategies as indicated by findings.	Students will utilize and determine safety requirements and practices identified in the current edition of the NEC. Students, when given a job scenario, will identify electrical installation deficiencies in accordance with the current edition of the NEC. Students when given a job site scenario will specify solutions to reported electrical installation deficiencies IAW the current edition of the NEC.

Master Course Syllabus

Technology Utilization: Students will apply knowledge of computers on a level compatible with job and/or educational demands. • Demonstrate a basic knowledge of computer applications including word processing, spreadsheets, databases, and presentation software. • Use basic operating system functions competently (e.g. store and retrieve data, load software). • Demonstrate communication and research skills through use of the internet.	Students will utilize computer skills to research and generate solutions to electrical installation challenges that are consistent with requirements of the current edition of the NEC.

General Education Core Competencies	Course Methodology, Content and/or Assessment
Interpersonal Skills: Students will deal effectively and appropriately with others. • Interact well with individuals and groups from diverse backgrounds and cultures. • Work with others in situational analysis, problem solving, and task accomplishment. • Demonstrate respect for the rights, work, and views of others.	Can work effectively with other students in completing assignments as a project team. Is able and willing to instruct less experienced students in completing work assignments. Is willing and able to explain the nature of a problem and the action taken to recommend necessary adjustments or repairs. Demonstrates flexibility in assigned shared responsibilities. Interacts well with individuals from diverse backgrounds and cultures while refraining from discriminatory practices. (ex. Gender)
Professionalism: Students will exhibit professionalism through observances of a code of ethics, a sense of responsibility, good habits, and a positive attitude. • Demonstrate personal and business integrity and ethics. • Recognize, manage, and cope with the transitions of change. • Utilize informational resources for lifelong learning.	The student will have to show the ability and proper attire, to project professionalism in the industrial/ mechatronics field. Be eager for a lifelong learning career.

Master Course Syllabus

College Policies

Policy Type	Policy Description
Attendance Policy	Williamsburg Technical College does not require specific attendance in a course. Acknowledging that participation supports student success in coursework, however, individual instructors may set attendance guidelines for the course. Those specific guidelines must be included in the course syllabus. (*See Syllabus Addendum provided by the instructor.)* In addition, students must attend during the first two weeks of class or inform the instructor of their intent to attend to remain on the class roster. If no prior arrangements have been made and the student does not attend during the first two weeks following the semester start date, the student will be dropped as a "no show" from that course following the second week of class. Class rosters will be final as of the end of the second week of classes. Students may withdraw from a class at any time by completing a withdrawal form in the Student Services Office. A student can only receive a "WP" grade if withdrawal is completed in the Student Services Office prior to the last date to receive a "WP" grade published in the academic calendar. Students who fail to withdraw by the specified time will receive a letter grade for the course. For specific procedures related to this policy, refer to WTC Procedure D-23.1.
Policy Type	**Policy Description**
Policy for Students with Disabilities	The Student Affairs Division provides counseling and support services which help students with disabilities to pursue academic programs of their choice and participate fully in campus life. The AVP for Student Affairs can arrange counseling, special parking, priority registration, and other reasonable services needed by students with disabilities. Students with disabilities are encouraged to contact the AVP for Student Affairs to discuss needs and concerns as they arise.
Policy for Academic Misconduct	All forms of academic dishonesty including, but not limited to, cheating on tests, plagiarism, collusion, and falsification of information will call for discipline. See the Student Code & Grievance Procedure in the Williamsburg Technical College Catalog for details.

Master Course Syllabus

Grading Policy	The College operates on the semester hour system, and the following symbols are used in grading: A-- Excellent B -- Above Average C -- Average D -- Passing F -- Failure I -- Incomplete WF -- Withdrawal while failing WP -- Withdrawal while passing
Policy for Class Safety and Emergencies	Injuries must be reported to the AVP for Student Affairs immediately. Insurance claim forms are available in the Student Affairs division. Please refer to the college catalogue for more information on how Williamsburg Technical College addresses safety and emergency issues. For additional information, contact Student Affairs at 843.355.4162. Students taking coursework at off-site locations are responsible for reading and adhering to all safety instructions and guidance at the off-site location. Health Services and First Aid Williamsburg Technical College is a commuter institution; therefore, infirmary facilities are not provided. Basic first aid for minor injuries is available, and first aid kits are located in various departments of the College. Major illness or injury will be treated by health professionals. The campus is located adjacent to Williamsburg Regional Hospital. Each student is covered by accident insurance at no additional cost. This group insurance covers the student while on campus and during college-sponsored group travel.