



CEC230 Commercial HVAC Syllabus

Course Information

Credits	4
Campus	Washburn Institute of Technology
Address	5724 SW Huntoon
City/State/Zip	Topeka, Kansas 66604
Office Fax	785-273-7080

Description

This course will introduce students to the commercial applications of various HVAC systems. A strong foundation in refrigeration theory is required as well as a comprehensive understanding of system airflow and electrical fundamentals. Students who complete this course will be skilled in reading advanced electrical schematics and be able to describe the function and application of various commercial systems and components including Direct Digital Control systems and frequency drives. This is a capstone course.

Textbooks

Carter Stanfield & David Skaves, *AHRI Fundamentals of HVACR*, Edition: 3rd, ISBN: 978-0-13-401616-0
Ronnie J. Auvil, *HVAC Control Systems*. ATP. Edition: 4th, ISBN: 978-0-8269-0779-0
Ronnie J. Auvil, *HVAC Control Systems Workbook*. ATP: Edition: 4th, ISBN: 978-0-8269-0780-6

Student Learning Outcomes:

- A. Communicate effectively
- B. Integrate technology
- C. Learn effectively
- D. Demonstrate cooperative teamwork skills
- E. Apply safety in the workplace
- F. Think critically and creatively
- G. Demonstrate responsible work ethics

Competencies

1. Describe the function of air-quality and air-conditioning sensors.
2. Identify resources for obtaining product information.

3. Describe and explain a basic control loop.
4. Identify Inputs and outputs.
5. Explain the different types of control actions.
6. Identify common control system characteristics.
7. Describe common control system arrangements.
8. Identify common control system requirements.
9. Describe the function and application of common types of control systems.
10. Explain control system anticipation methods.
11. Explain unit level control.
12. Explain system level control.
13. Identify the qualities of the building automation system.
14. Explain the difference between a constant volume and VAV system.
15. Explain the operations of a VAV system.
16. List and identify the components of a VAV system.
17. Describe occupied, unoccupied, morning warm-up and cool-down modes.
18. Describe common methods for wiring inputs, outputs, and peripheral devices.
19. Describe system interoperability and protocols.
20. Develop a schedule for system operations.
21. Read sensor resistances as compared to manufacturer data.
22. Read commercial wiring diagrams and identify components.
23. Use a Multi-meter to determine voltage at test points.
24. NC3 BAS I Certification

Guidelines for Success

Assessment Plan

Assessment is an integral part of the educational process at Washburn Tech and accurate feedback is an important tool in continuously improving the institution's technical programs. Students can expect to participate in assessment activities prior to entry into programs, within specific courses and following program completion for specific fields of study.

Grading Scale

92 - 100%	= A
85 - 91%	= B
78 - 84%	= C
70 - 77%	= D
<70%	= F

Attendance

Classroom attendance is required. Material missed must be made up with the instructor.

Disability

The Americans with Disabilities Act (ADA) Office is responsible for assisting in arranging accommodations and for identifying resources at Washburn Institute of Technology for persons with disabilities. Qualified students with disabilities **MUST** self-identify by completing an application. In addition students must provide appropriate medical documentation to the ADA coordinator to be eligible for accommodations. New requests for accommodations

should be submitted at least two months or more prior to the date the accommodations are needed. However, please contact the ADA office as soon as a need may arise. Depending on the accommodation request, four to eight weeks lead time may be needed for timely and effective provision of accommodations.

The ADA Office coordinates and assists in arranging accommodations it deems appropriate for eligible students on a case-by-case basis. If you are a student with a disability that may substantially limit your ability to participate in any of our classes and you believe that you will need accommodations, it is your responsibility to contact: ADA Coordinator, 785.670.3365 or Gloria.christian@washburn.edu.

Washburn University prohibits discrimination on the basis of race, color, religion, age, national origin, ancestry, disability, sex, sexual orientation, gender identity, genetic information, veteran status, or marital or parental status. The following person has been designated to handle inquiries regarding the non-discrimination policies: Dr. Pamela Foster, Equal Opportunity Director/Title IX Coordinator, Washburn University, 1700 SW College Ave, Topeka, Kansas 66621, 785.670.1509, eodirector@washburn.edu