

Course Outline of Record

1. Course Code: ACR-378F
2.
 - a. Long Course Title: Indoor Air Quality and Economizers
 - b. Short Course Title: AIR QLTY & ECONOMIZR
3.
 - a. Catalog Course Description:
 The course is designed for both the novice and existing workforce to understand how to properly diagnose and repair economizers. This course will also cover replacement, installation and setup of economizers.
 - b. Class Schedule Course Description:
 Diagnosing, repair and installation of economizers.
 - c. Semester Cycle (if applicable): *N/A*
 - d. Name of Approved Program(s):
 - NEW CERTIFICATE IN PROGRESS Certificate of Completion
4. Total Units: 0 Total Semester Hrs: 18.00
 Lecture Units: 0 Semester Lecture Hrs: 9.00
 Lab Units: 0 Semester Lab Hrs: 9.00
 Class Size Maximum: 25 Allow Audit: No
 Repeatability Noncredit - Unlimited
 Justification 0
5. Prerequisite or Corequisite Courses or Advisories:
Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm I-A)
 Prerequisite: ACR 378A
 Prerequisite: ACR 378E
6. Textbooks, Required Reading or Software: (List in APA or MLA format.)
 - a. John Tomczyk; Eugene Silberstein, B.A., M.S., BEAP, CMHE; Bill Whitman; Bill Johnson (2017). Refrigeration Air Conditioning Technology (8th/e). Boston, MA 02210 Cengage Learning. ISBN: 9781305578296
 College Level: Yes
 Flesch-Kincaid reading level: 12.3
7. Entrance Skills: *Before entering the course students must be able:*
 - a.
 Describe ozone depletion and global warming
 - ACR 378A - Describe ozone depletion and global warming
 - b.
 Define Psychrometric Fundamentals
 - ACR 378E - Define Psychrometric Fundamentals
 - c.
 Understand the thermodynamics of air and water vapor
 - ACR 378E - discuss the thermodynamics of air and water vapor
 - d.
 Understand air volume and density.
 - ACR 378E - discuss air volume and density.

ACR 378F-Indoor Air Quality and Economizers

e.

Understand the comfort zone and the effect different temperatures and relative humidity has on human comfort.

- ACR 378E - discuss the comfort zone and the effect different temperatures and relative humidity has on human comfort.

8. Course Content and Scope:

Lecture:

1. Define indoor air quality IAQ.
2. Define Ventilation.
3. Describe ASHRAE Standard 62.
4. Explain fixed dry bulb, differential dry bulb, fixed enthalpy, and differential enthalpy.
5. Describe economizers
6. Discuss demand control ventilation(DCV)
7. Define temperature and humidity regions to properly setup economizer .
8. Review of California T-24, energy code , as it applied to economizers.
9. Explain and discussion solution for repairing economizers.
10. Introduction of advanced building controls and how they function with economizers.

Lab: *(if the "Lab Hours" is greater than zero this is required)*

- Economizer diagnostics
- Economizer set up
- Demand ventilation set up

9. Course Student Learning Outcomes:

1.
Evaluate an economizer and determine if it is operating properly.
2.
Set up the controls on an economizer for proper operation.
3.
Understand when to economize and when not to.
4.
Demonstrate understanding of demand control ventilation and how it is integrated in economizers.

10. Course Objectives: *Upon completion of this course, students will be able to:*

- a. Understand different control methods of economizers
- b. Set up digital economizers
- c. Set minimum position on economizers
- d. Set up demand control ventilation

11. Methods of Instruction: *(Integration: Elements should validate parallel course outline elements)*

- a. Activity
- b. Collaborative/Team
- c. Demonstration, Repetition/Practice
- d. Discussion
- e. Participation
- f. Technology-based instruction

12. Assignments: *(List samples of specific activities/assignments students are expected to complete both in and outside of class.)*

ACR 378F-Indoor Air Quality and Economizers

In Class Hours: 18.00

Outside Class Hours: 18.00

a. In-class Assignments

- Reading Assignments
- Projects
 - use psychrometric to plot economizer set points
 - setup economizer based on scheme based on parameters

b. Out-of-class Assignments

Reading Assignments

13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*

- True/false/multiple choice examinations
- Student participation/contribution
- Student preparation
- Organizational/timelines assessment

14. Methods of Evaluating: Additional Assessment Information:

15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*

PO - Career and Technical Education

Fulfill the requirements for an entry- level position in their field.

Display the skills and aptitude necessary to pass certification exams in their field.

IO - Personal and Professional Development

Self-evaluate knowledge, skills, and abilities.

Value the feedback of others.

16. Comparable Transfer Course

University System	Campus	Course Number	Course Title	Catalog Year
--------------------------	---------------	----------------------	---------------------	---------------------

17. Special Materials and/or Equipment Required of Students:

18. Materials Fees: Required Material?

Material or Item	Cost Per Unit	Total Cost
-------------------------	----------------------	-------------------

19. Provide Reasons for the Substantial Modifications or New Course:

The CEC has mandated that all commercial HVAC Package units 5 tons and larger must be equipped with economizers. Commercial HVAC equipment that have economizers that are setup properly can save a significant amount of money however most economizers do not function properly or are not setup properly and they waste a significant amount of money. This course is necessary for retraining of existing workforce and the introduction to new students in the proper understanding of air properties necessary for setting up the controls on an economizer. This course is an advanced course that focuses on proper setup and diagnosis of economizers.

20. a. Cross-Listed Course (*Enter Course Code*): *N/A*
 b. Replacement Course (*Enter original Course Code*): *N/A*

21. Grading Method (*choose one*): Pass/No Pass Only

22. MIS Course Data Elements

- a. Course Control Number [CB00]: *N/A*
 b. T.O.P. Code [CB03]: 94600.00 - Environmental Control Tec

ACR 378F-Indoor Air Quality and Economizers

- c. Credit Status [CB04]: N - Noncredit
- d. Course Transfer Status [CB05]: C = Non-Transferable
- e. Basic Skills Status [CB08]: 2N = Not basic skills course
- f. Vocational Status [CB09]: Clearly Occupational
- g. Course Classification [CB11]: J - Workforce Preparation Enhanced Funding
- h. Special Class Status [CB13]: N - Not Special
- i. Course CAN Code [CB14]: N/A
- j. Course Prior to College Level [CB21]: Y = Not Applicable
- k. Course Noncredit Category [CB22]: J - Workforce Preparation
- l. Funding Agency Category [CB23]: Y = Not Applicable
- m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (if program-applicable): NEW CERTIFICATE IN PROGRESS

Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)

23. Enrollment - Estimate Enrollment

First Year: 20

Third Year: 25

24. Resources - Faculty - Discipline and Other Qualifications:

a. Sufficient Faculty Resources: Yes

b. If No, list number of FTE needed to offer this course: N/A

25. Additional Equipment and/or Supplies Needed and Source of Funding.

N/A

26. Additional Construction or Modification of Existing Classroom Space Needed. (Explain:)

N/A

27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the Course: Yes

28. Originator George Brown Origination Date 10/17/16