

Curriculum Action Request (CAR) Form
COURSE (New Course, Course Modification, Five Year Review)
University of Hawai'i Maui College

Curriculum Proposal # 2015.18
(for CURCOM use only)

1. Curriculum Action

- New Course Course Modification Five Year Review

2. Proposer

Clifford Rutherford

3. Department

- Allied Health Business & Hospitality Career & Tech Education
 English Humanities Social Science
 Science/Tech/Eng/Math

4. Course Alpha

MAIN

5. Course Number

65

6. Course Title

Air Conditioning and Refrigeration

7. If this is a course modification or a five year review, please check the curriculum items being modified.

- | | | |
|--|---|--|
| <input type="checkbox"/> 1. Course Alpha | <input type="checkbox"/> 2. Course Number | <input type="checkbox"/> 3. Course Title |
| <input type="checkbox"/> 4. Credits | <input type="checkbox"/> 5. Contact Hours | <input type="checkbox"/> 6. Course Description |
| <input type="checkbox"/> 7. Prerequisites | <input type="checkbox"/> 8. Corequisites | <input type="checkbox"/> 9. Rec Prep |
| <input type="checkbox"/> 10. Cross-list w other course | <input type="checkbox"/> 13. Grading Method | <input type="checkbox"/> 14. Repeatable for credit? |
| <input checked="" type="checkbox"/> 15. SLOs | <input checked="" type="checkbox"/> 16. Course Competencies | <input checked="" type="checkbox"/> 17. Content & Timeline |
| <input checked="" type="checkbox"/> 18. PLOs | <input checked="" type="checkbox"/> 19. CASLOs | <input checked="" type="checkbox"/> 21. Method of Delivery |
| <input checked="" type="checkbox"/> 22. Text and Materials | <input checked="" type="checkbox"/> 23. Maximum Enrollment | <input type="checkbox"/> 29. Course Designation |
| <input type="checkbox"/> 31. Catalog Modification | | |
| <input type="checkbox"/> Other | | |

8. Proposed Semester

Fall 2015

9. Effective Semester (1 Year from Proposed Semester)

Fall 2016

University of Hawaii Maui College
MAIN 65 - Air Conditioning and Refrigeration

1. Course Alpha.

MAIN

2. Course Number.

65

3. Course Title/Catalog Title.

Air Conditioning and Refrigeration

4. Number of Credits.

2

5. Contact Hours/Type.

- Hour lecture/lab (3)

6. Course Description.

Studies air conditioning systems of residential and commercial buildings. Explores various types of refrigeration systems popular today. Introduces concepts of planning, testing, troubleshooting, and balancing such systems.

7. Pre-Requisites.

None

8. Co-requisites.

None

9. Recommended Preparation.

None

10. Is this a cross-listed course?

NO

11. Reason for Proposal. Why is this course being proposed or modified? This question requires specific information as part of the explanation.

Modify existing course to update prerequisites, PLOs, SLOs, and competencies

12. Effective Semester and Year.

Fall 2016

13. Grading Method. What grading methods may be used for this course?

- Standard (Letter,Cr/NCr,Audit) (0)

14. Is this course repeatable for credit? How often can this course be counted toward a degree or certificate?

NO

15. Course Student Learning Outcomes (SLOs).

Course SLO/Competency	Identify various commercial air conditioning systems	Identify a wide variety of air conditioning and refrigeration parts and materials used in buildings	Explain one, two, and three loop air conditioning systems	Perform accurate measurements of air conditioning and refrigeration system components	Recognize the concepts of refrigeration piping design	Employ simple hand tools for air conditioning and refrigeration repair and maintenance projects	Perform daily, weekly, and monthly system inspections	Employ power tools for typical air conditioning and refrigeration repair projects	Identify typical system repair procedures	Work with others in a team approach to problem solving	Recognize and identify procedures for Freon and refrigerant recovery in accordance with EPA guidelines
Identify and Explain basic commercial air conditioning designs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Employ measurement and building standards for A/C and refrigeration systems		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Use hand and power tools safely for air conditioning and refrigeration maintenance and repair				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Demonstrate regular maintenance procedures for air conditioning and refrigeration systems	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Describe basic refrigeration system design	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Compose timely and accurate reports on work completed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

Course SLO/PSLO	Use and maintain appropriate materials, tools, equipment, and procedures to carry out tasks performed on construction projects according to safety and industry standards.	Use math, computer, and oral and written communication skills to solve construction project problems.	Create and maintain accurate documentation of construction and maintenance projects.	Describe industry standard Green Building practices in construction and maintenance projects.	Read and interpret blueprint s, and/or schematics, and specifications to plan projects.	Demonstrate the craftsmanship standards of dependability, punctuality, and quality.	Examine and use proper mechanical, electrical, and carpentry codes and standards applicable to construction and repair.
Identify and Explain basic commercial air conditioning designs		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Employ measurement and building standards for A/C and refrigeration systems	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Use hand and power tools safely for air conditioning and refrigeration maintenance and repair	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>

Demonstrate regular maintenance procedures for air conditioning and refrigeration systems	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Describe basic refrigeration system design			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Compose timely and accurate reports on work completed		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

16. Course Competencies.

Competency
Identify various commercial air conditioning systems
Identify a wide variety of air conditioning and refrigeration parts and materials used in buildings
Explain one, two, and three loop air conditioning systems
Perform accurate measurements of air conditioning and refrigeration system components
Recognize the concepts of refrigeration piping design
Employ simple hand tools for air conditioning and refrigeration repair and maintenance projects
Perform daily, weekly, and monthly system inspections
Employ power tools for typical air conditioning and refrigeration repair projects
Identify typical system repair procedures
Work with others in a team approach to problem solving
Recognize and identify procedures for Freon and refrigerant recovery in accordance with EPA guidelines

17. Recommended Course Content and Timeline. The course content facilitates the course competencies. Course content may be organized by weeks, units, topics or the like.

- 1 Week: Introduction and system identification skills
- 2-3 Weeks: A/C one, two, and three loop systems
- 2-4 Weeks: Use of hand and power tools and system materials
- 2-3 Weeks: Exterior/interior split a/c systems and repairs
- 2-3 Weeks: Refrigeration systems and repairs
- 1 Week: Commercial chill and freezer box systems
- 1 Week: Domestic refrigerators
- 1 Week: System parameters troubleshooting
- 2-3 Weeks: A/C and refrigeration system maintenance and repair projects

18. Program Learning Outcomes.

Program SLO
Use and maintain appropriate materials, tools, equipment, and procedures to carry out tasks performed on construction projects according to safety and industry standards.
Use math, computer, and oral and written communication skills to solve construction project problems.
Create and maintain accurate documentation of construction and maintenance projects.
Describe industry standard Green Building practices in construction and maintenance projects.
Read and interpret blueprints, and/or schematics, and specifications to plan projects.
Demonstrate the craftsmanship standards of dependability, punctuality, and quality.
Examine and use proper mechanical, electrical, and carpentry codes and standards applicable to construction and repair.

19. College-wide Academic Student Learning Outcomes (CASLOs).

Creativity - Able to express originality through a variety of forms.
Critical Thinking - Apply critical thinking skills to effectively address the challenges and solve problems.
Information Retrieval and Technology - Access, evaluate, and utilize information effectively, ethically, and responsibly.
Oral Communication - Practice ethical and responsible oral communications appropriately to a variety of audiences and

purposes.

Quantitative Reasoning - Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately.

Written Communication - Write effectively to convey ideas that meet the needs of specific audiences and purposes.

20. Linking.

21. Method(s) of delivery appropriate for this course.

- Classroom/Lab (0)

Instructional methods may vary considerably with instructors and specific instructional methods will be at the discretion of the instructor teaching the course. Suggested techniques might include, but are not limited to:

Lecture, presentation, problem solving, and class exercises or readings
Class discussion or guest lecturers
Audio, visual, or internet presentations
Student class presentations
Group or individual projects
Shop exercises and/or projects (individual or group)
Interactive computer programs or websites
Other contemporary learning techniques e.g., Service Learning, Co-op, self-paced, etc.)

22. Text and Materials, Reference Materials, and Auxiliary Materials.

Appropriate text(s) and materials will be chosen at the time the course is offered from those currently available in the field. Open Source optional.

Example: Modern Refrigeration and Air Conditioning 19th Edition, Publication Date: 2013

ISBN 13: 9781619601994

ISBN: 1619601990

Author: Andrew D. Althouse; Carl H. Turnquist; Alfred F. Bracciano; Daniel C. Bracciano; Gloria M. Bracciano

Publisher: Goodheart-Willcox

Text may be supplemented with but not limited to videos, internet resources, workbooks, demonstration equipment and visual aids at the discretion of the instructor.

23. Maximum enrollment.

20 (Vocational Lab capacity)

24. Particular room type requirement. Is this course restricted to particular room type?

NO

Vocational Trades Lab

25. Special scheduling considerations. Are there special scheduling considerations for this course?

NO

26. Are special or additional resources needed for this course?

No

27. Does this course require special fees to be paid for by students?

NO

28. Does this course change the number of required credit hours in a degree or certificate?

No

29. Course designation(s) for the Liberal Arts A.A. degree and/or for the college's other associate degrees.

Degree	Program	Category
Associate in Arts:		
AS:		
AAS:	Sustainable Construction Technology	PE - Program Elective
BAS:		
Developmental/Remedial:		

30. Course designation(s) for other colleges in the UH system.

Similar to FENG 30 Basic Air Conditioning and Refrigeration, Kauai CC

31. Indicate the year and page # of UHMC catalog referred to. For new or modified courses, please indicate the catalog pages that need to be modified and provide a sheet outlining those changes.

No changes to UHMC 2015-2016 Catalog: Program Map, page 53; Course Information 129

32. College-wide Academic Student Learner Outcomes (CASLOs).

Standard 1 - Written Communication	
Write effectively to convey ideas that meet the needs of specific audiences and purposes.	
Outcome 1.1 - Use writing to discover and articulate ideas.	1
Outcome 1.2 - Identify and analyze the audience and purpose for any intended communication.	0
Outcome 1.3 - Choose language, style, and organization appropriate to particular purposes and audiences.	0
Outcome 1.4 - Gather information and document sources appropriately.	1
Outcome 1.5 - Express a main idea as a thesis, hypothesis, or other appropriate statement.	1
Outcome 1.6 - Develop a main idea clearly and concisely with appropriate content.	1
Outcome 1.7 - Demonstrate a mastery of the conventions of writing, including grammar, spelling, and mechanics.	0
Outcome 1.8 - Demonstrate proficiency in revision and editing.	0
Outcome 1.9 - Develop a personal voice in written communication.	0
Standard 2 - Quantitative Reasoning	
Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately.	
Outcome 2.1 - Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.	1
Outcome 2.2 - Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.	1
Outcome 2.3 - Communicate clearly and concisely the methods and results of quantitative problem solving.	0
Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.	1

Outcome 2.5 - Define quantitative issues and problems, gather relevant information, analyze that information, and present results.	2
Outcome 2.6 - Assess the validity of statistical conclusions.	2
Standard 3 - Information Retrieval and Technology. Access, evaluate, and utilize information effectively, ethically, and responsibly.	
Outcome 3.1 - Use print and electronic information technology ethically and responsibly.	1
Outcome 3.2 - Demonstrate knowledge of basic vocabulary, concepts, and operations of information retrieval and technology.	1
Outcome 3.3 - Recognize, identify, and define an information need.	2
Outcome 3.4 - Access and retrieve information through print and electronic media, evaluating the accuracy and authenticity of that information.	2
Outcome 3.5 - Create, manage, organize, and communicate information through electronic media.	1
Outcome 3.6 - Recognize changing technologies and make informed choices about their appropriateness and use.	1
Standard 4 - Oral Communication Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.	
Outcome 4.1 - Identify and analyze the audience and purpose of any intended communication.	1
Outcome 4.2 - Gather, evaluate, select, and organize information for the communication.	1
Outcome 4.3 - Use language, techniques, and strategies appropriate to the audience and occasion.	1
Outcome 4.4 - Speak clearly and confidently, using the voice, volume, tone, and articulation appropriate to the audience and occasion.	0
Outcome 4.5 - Summarize, analyze, and evaluate oral communications and ask coherent questions as needed.	2
Outcome 4.6 - Use competent oral expression to initiate and sustain discussions.	0
Standard 5 - Critical Thinking Apply critical thinking skills to effectively address the challenges and solve problems.	
Outcome 5.1 - Identify and state problems, issues, arguments, and questions contained in a body of information.	3
Outcome 5.2 - Identify and analyze assumptions and underlying points of view relating to an issue or problem.	3
Outcome 5.3 - Formulate research questions that require descriptive and explanatory analyses.	3
Outcome 5.4 - Recognize and understand multiple modes of inquiry, including investigative methods based on observation and analysis.	3
Outcome 5.5 - Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues, values, and biases through the use of appropriate evidence.	3
Outcome 5.6 - Apply problem-solving techniques and skills, including the rules of logic and logical sequence.	3
Outcome 5.7 - Synthesize information from various sources, drawing appropriate conclusions.	3
Outcome 5.8 - Communicate clearly and concisely the methods and results of logical reasoning.	1
Outcome 5.9 - Reflect upon and evaluate their thought processes, value system, and world views in comparison to those of others.	0
Standard 6 - Creativity Able to express originality through a variety of forms.	
Outcome 6.1: Generate responses to problems and challenges through intuition and non-linear thinking.	0
Outcome 6.2: Explore diverse approaches to solving a problem or addressing a challenge.	2
Outcome 6.3: Sustain engagement in activities without a preconceived purpose.	0
Outcome 6.4: Apply creative principles to discover and express new ideas.	0
Outcome 6.5: Demonstrate the ability to trust and follow one's instincts in the absence of external direction	2
Outcome 6.6: Build upon or adapt the ideas of others to create novel expressions or new solutions.	0

33. Additional Information