

**WASHTENAW COMMUNITY COLLEGE  
COURSE-SYLLABUS APPROVAL FORM (CSAF)**

APP 243

**SECTION I. SUBMISSION INFORMATION**

|   |  |  |  |  |
|---|--|--|--|--|
| <b>1. Course:</b><br>Discipline/No: <u>APP 243</u> Title: <u>Medium Temperature Refrigeration</u> Start Term <u>F02</u>   |  |  |  |  |
| Division Code: <u>HAT</u> Department Code: <u>CIND</u> Org #: <u>14725</u> Don't publish: <input checked="" type="checkbox"/> in College Catalog <input checked="" type="checkbox"/> in Time Schedule <input checked="" type="checkbox"/> on Web Page   |  |  |  |  |
| <b>2. Type of Approval:</b><br><input checked="" type="checkbox"/> Full Approval<br><input type="checkbox"/> Conditional Approval<br><hr/> <input checked="" type="checkbox"/> This proposal previously received conditional approval for the term: <u>2002-2003</u>  | <b>3. Reason for Submission:</b> This Course is being submitted for: (check all that apply)<br><input type="checkbox"/> New Course Approval<br><input type="checkbox"/> Five-year Syllabus Review <input type="checkbox"/> No changes to course<br><input checked="" type="checkbox"/> Major Change(s)<br><input type="checkbox"/> Minor Change(s)*<br><input type="checkbox"/> Reactivation of Inactive Course<br><input type="checkbox"/> Inactivation<br><small>*If requesting a change to a course that has conditional approval, please submit a complete syllabus.</small>                             |  |  |  |
| <b>4. Change Information:</b><br><table style="width:100%;"> <tr> <td style="width:50%; vertical-align: top;"> <b>Minor Changes</b><br/> <input type="checkbox"/> Course Discipline/Number (was _____)<br/> <input type="checkbox"/> Course Title (was _____)<br/> <input type="checkbox"/> Course Description<br/> <input type="checkbox"/> Class Capacity (was: ____)<br/> <input type="checkbox"/> Pre or Co-requisites<br/> <input type="checkbox"/> Course Objectives (minor changes)<br/> <input type="checkbox"/> Distribution of Contact Hours (contact hours were: lect: _____ lab _____ clin _____ other _____)<br/> <input type="checkbox"/> Other _____             </td> <td style="width:50%; vertical-align: top;"> <b>Major Changes</b><br/> <input checked="" type="checkbox"/> Credit hours (credits were: <u>04</u>)<br/> <input type="checkbox"/> Change in Grading Method<br/> <input type="checkbox"/> Total Contact Hours (total contact hours were: _____)<br/> <input type="checkbox"/> Approval for offering an Honors Section<br/> <input type="checkbox"/> Approval for offering Distance Learning Sections<br/> <input type="checkbox"/> General Education Distribution Course: Add <input type="checkbox"/> Remove <input type="checkbox"/><br/> <input type="checkbox"/> Pre or Co-requisites (that affect other departments)             </td> </tr> </table> |  |  | <b>Minor Changes</b><br><input type="checkbox"/> Course Discipline/Number (was _____)<br><input type="checkbox"/> Course Title (was _____)<br><input type="checkbox"/> Course Description<br><input type="checkbox"/> Class Capacity (was: ____)<br><input type="checkbox"/> Pre or Co-requisites<br><input type="checkbox"/> Course Objectives (minor changes)<br><input type="checkbox"/> Distribution of Contact Hours (contact hours were: lect: _____ lab _____ clin _____ other _____)<br><input type="checkbox"/> Other _____ | <b>Major Changes</b><br><input checked="" type="checkbox"/> Credit hours (credits were: <u>04</u> )<br><input type="checkbox"/> Change in Grading Method<br><input type="checkbox"/> Total Contact Hours (total contact hours were: _____)<br><input type="checkbox"/> Approval for offering an Honors Section<br><input type="checkbox"/> Approval for offering Distance Learning Sections<br><input type="checkbox"/> General Education Distribution Course: Add <input type="checkbox"/> Remove <input type="checkbox"/><br><input type="checkbox"/> Pre or Co-requisites (that affect other departments) |
| <b>Minor Changes</b><br><input type="checkbox"/> Course Discipline/Number (was _____)<br><input type="checkbox"/> Course Title (was _____)<br><input type="checkbox"/> Course Description<br><input type="checkbox"/> Class Capacity (was: ____)<br><input type="checkbox"/> Pre or Co-requisites<br><input type="checkbox"/> Course Objectives (minor changes)<br><input type="checkbox"/> Distribution of Contact Hours (contact hours were: lect: _____ lab _____ clin _____ other _____)<br><input type="checkbox"/> Other _____  | <b>Major Changes</b><br><input checked="" type="checkbox"/> Credit hours (credits were: <u>04</u> )<br><input type="checkbox"/> Change in Grading Method<br><input type="checkbox"/> Total Contact Hours (total contact hours were: _____)<br><input type="checkbox"/> Approval for offering an Honors Section<br><input type="checkbox"/> Approval for offering Distance Learning Sections<br><input type="checkbox"/> General Education Distribution Course: Add <input type="checkbox"/> Remove <input type="checkbox"/><br><input type="checkbox"/> Pre or Co-requisites (that affect other departments) |  |  |  |
| <b>5. Rationale</b> Changes are being made in response to data from Assessment: yes <input type="checkbox"/> no <input type="checkbox"/>  |  |  |  |  |

**SECTION II. SIGNATURES**

|  |                                  |  |
|--|----------------------------------|--|
| <b>1. Department Review</b><br>Will any new resources be required? No, none anticipated <input checked="" type="checkbox"/> Yes <input type="checkbox"/><br>You must consult all departments that may be affected by this course. List departments contacted below and attach relevant documents.<br><hr/> Does the department support approval of this course? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no<br>Print: <u>Patricia Crider</u> Faculty/Preparer Signature: <u>[Signature]</u> Date: <u>6/16/02</u><br>Print: _____ Department Chair Signature: _____ Date: _____ |                                  |  |
| <b>2. Division Review</b><br>Is this a curricular priority for your division? <input type="checkbox"/> yes <input type="checkbox"/> no (Comment _____)<br>What is the estimated enrollment? _____<br>Recommendation <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br>Dean's Signature: <u>[Signature]</u> Date: <u>6/24/02</u>   |                                  |  |
| <b>3. Curriculum Committee Review</b><br>Recommendation <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br>Curriculum Committee Chair's Signature: <u>[Signature]</u> Date: <u>9.12.02</u>   |                                  |  |
| <b>4. Vice President for Instruction and Student Services Approval</b><br>Approval <input type="checkbox"/> Yes <input type="checkbox"/> No<br>Executive Vice President's Signature: <u>[Signature]</u> Date: <u>7/17/02</u>   |                                  |  |
| ACS Code _____   | Entered in Banner <u>1/24/02</u> | Entered in Access _____ Log File _____ |
| Approved for General Education Area/Group _____  |                                  | Syllabus Date <u>2002/09</u>           |

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**SECTION III. COURSE SYLLABUS**

**A. COURSE DETAILS**

**Discipline & No.:** APP 243      **Title:** Medium Temperature Refrigeration

**1. Description:**

This class is designed to help students understand medium temperature systems. The class focuses on where medium temperature systems are used and demonstrates how to set up controls on a medium temperature system. Students will be expected to troubleshoot a medium temperature system.

|   |  |  |   |
|---|--|--|---|
| <b>2. Credit Hours:</b> <u>03</u><br>If Variable credit, Give Range:<br>_____ to _____ credits<br><br>If repeatable for credit, how<br>many times _____ | <b>3. Contact Hours per Semester:</b><br>Lecture: <u>30</u><br>Lab: <u>30</u><br>Clinical: _____<br>Other: _____<br>Total Contact Hours: <u>60</u> | <b>4. Class Capacity:</b><br><u>24</u> | <b>5. Course Options:</b><br><input type="checkbox"/> Distance learning<br><br><input type="checkbox"/> Honors<br><br><input type="checkbox"/> P/NP Grading |
|---|--|--|---|

| 6. Prerequisite(s)<br>and/or "((" Course | Min<br>Grade | *Concurrent<br>Enrollment | Test Name | Min.<br>Score | **Level<br>")" | I                        | II                       | Other Prerequisites |
|--|--------------|---------------------------|-----------|---------------|----------------|--------------------------|--------------------------|---------------------|
| <input type="checkbox"/> _____           | _____        | <input type="checkbox"/>  | _____     | _____         | _____          | <input type="checkbox"/> | <input type="checkbox"/> | _____               |
| <input type="checkbox"/> _____           | _____        | <input type="checkbox"/>  | _____     | _____         | _____          | <input type="checkbox"/> | <input type="checkbox"/> | _____               |
| <input type="checkbox"/> _____           | _____        | <input type="checkbox"/>  | _____     | _____         | _____          | <input type="checkbox"/> | <input type="checkbox"/> | _____               |
| <input type="checkbox"/> _____           | _____        | <input type="checkbox"/>  | _____     | _____         | _____          | <input type="checkbox"/> | <input type="checkbox"/> | _____               |
| <input type="checkbox"/> _____           | _____        | <input type="checkbox"/>  | _____     | _____         | _____          | <input type="checkbox"/> | <input type="checkbox"/> | _____               |
| <input type="checkbox"/> _____           | _____        | <input type="checkbox"/>  | _____     | _____         | _____          | <input type="checkbox"/> | <input type="checkbox"/> | _____               |
| <input type="checkbox"/> _____           | _____        | <input type="checkbox"/>  | _____     | _____         | _____          | <input type="checkbox"/> | <input type="checkbox"/> | _____               |
| <input type="checkbox"/> _____           | _____        | <input type="checkbox"/>  | _____     | _____         | _____          | <input type="checkbox"/> | <input type="checkbox"/> | _____               |
| <input type="checkbox"/> _____           | _____        | <input type="checkbox"/>  | _____     | _____         | _____          | <input type="checkbox"/> | <input type="checkbox"/> | _____               |

Consent Required

**7. Corequisites:**  
 \_\_\_\_\_  
 \_\_\_\_\_

|   |  |   |   |
|---|--|---|---|
| <b>8. Course Purpose:</b><br><input checked="" type="checkbox"/> Program Requirement<br><input type="checkbox"/> General Education<br><input type="checkbox"/> Program Support<br><input type="checkbox"/> Basic Skills/Developmental<br><input type="checkbox"/> Transfer<br><input type="checkbox"/> Industry/Professional Dev<br><input type="checkbox"/> Enrichment | <b>If a program requirement, specify<br/>the program(s)</b><br><br><u>Local 190 apprenticeship program</u><br>_____<br>_____ | <b>Please send syllabus for<br/>Transfer evaluation to:</b><br><input type="checkbox"/> EMU<br><input type="checkbox"/> UM<br>_____<br>_____<br>_____ | <b>Accepted for transfer:</b><br><input type="checkbox"/> EMU<br><input type="checkbox"/> UM<br>_____<br>_____<br>_____ |
|---|--|---|---|

|  |   |                          |                                     |                            |                           |  |  |
|--|---|--------------------------|-------------------------------------|----------------------------|---------------------------|--|--|
| <b>9. Terms Course will be offered:</b>        |   |                          |                                     |                            |                           |  |  |
| <b>Terms</b>                                   | <b>Session Length</b> (e.g. 15 weeks, 1 <sup>st</sup> 7½ weeks, etc.) | <b>Day</b>               | <b>Eve</b>                          | <b>Even years<br/>only</b> | <b>Odd years<br/>only</b> |  |  |
| <input checked="" type="checkbox"/> Fall       | <u>15 weeks</u>   | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/>  |  |  |
| <input checked="" type="checkbox"/> Winter     | <u>15 weeks</u>   | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/>  |  |  |
| <input checked="" type="checkbox"/> Spr/Summer | <u>15 weeks</u>   | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/>  |  |  |

**B. MAJOR INSTRUCTIONAL UNITS**

1. Medium Temperature Refrigeration
2. Components of Medium Temperature Refrigeration
3. Systems in the Medium Temperature Refrigeration
4. Gases used in Medium Temperature Refrigeration Systems
5. Condensate and Medium Temperature Systems

**C. INSTRUCTIONAL OBJECTIVES**

**Unit #1: Medium Temperature Refrigeration**

1. The student will define medium temperature systems
2. The student will describe when medium temperature systems are used

**Unit #2: Components of Medium Temperature Refrigeration**

1. The student will list and describe the components that make up the medium temperature refrigeration systems
2. The student will demonstrate the processes of setting up controls on a medium temperature refrigeration system.
3. The student will describe and demonstrate the differences between “walk-in” and “reach” systems

**Unit #3: Systems in Medium Temperature Refrigeration**

1. The student will describe and demonstrate proper thermal expansion valve setting operations and systems
2. The student will describe and demonstrate the proper set up of evaporator pressure regulating valves
3. The student will describe the functions of a medium temperature rack system
4. The student will describe a multiple evaporator system
5. The student will define the process of heat recovery in a rack system

**Unit #4: CFC's used in Medium Temperature Refrigeration**

1. The student will list the freon's used in Medium Temperature Refrigeration Systems
2. The student will demonstrate the processes of changing freon's in various systems
3. The student will identify various oils used in compressors for different freon's

**Unit #5: Condensate and Medium Temperature Refrigeration Systems**

1. The student will define and discuss defrost systems and timers
2. The student will discuss the process and functions of condensate evaporator heater pans
3. The student will discuss the requirements of condensate drain piping for coolers and freezers
4. The student will demonstrate competency in heat trace taping

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**D. INSTRUCTIONAL METHODS, EVALUATION CRITERIA, AND ASSESSMENT**

**1. Instructional Methods:**

|  |   |
|--|---|
| <input checked="" type="checkbox"/> Lecture/Discussion _____     | <input type="checkbox"/> Performances _____           |
| <input type="checkbox"/> Clinical Instruction _____              | <input type="checkbox"/> Group Critiques _____        |
| <input checked="" type="checkbox"/> Laboratory Assignments _____ | <input type="checkbox"/> Field Trips _____            |
| <input type="checkbox"/> Internet Assignments _____              | <input type="checkbox"/> Telecourse _____             |
| <input type="checkbox"/> Computer Simulations _____              | <input type="checkbox"/> ITV Course _____             |
| <input type="checkbox"/> On-Site Work Experience _____           | <input type="checkbox"/> Self-Paced Instruction _____ |
| <input type="checkbox"/> Team Assignments _____                  | <input type="checkbox"/> Other _____                  |
| <input type="checkbox"/> Demonstrations _____                    | <input type="checkbox"/> Other _____                  |

**2. Evaluation Criteria:**

|  |   |
|--|---|
| <input checked="" type="checkbox"/> Attendance _____       | <input checked="" type="checkbox"/> Quizzes _____     |
| <input checked="" type="checkbox"/> Class Discussion _____ | <input checked="" type="checkbox"/> Tests _____       |
| <input checked="" type="checkbox"/> Papers _____           | <input type="checkbox"/> Midterm _____                |
| <input type="checkbox"/> Portfolios _____                  | <input checked="" type="checkbox"/> Final Exam _____  |
| <input type="checkbox"/> Projects _____                    | <input type="checkbox"/> Presentations _____          |
| <input type="checkbox"/> Reports _____                     | <input type="checkbox"/> Individual Performance _____ |
| <input type="checkbox"/> Clinical Assignments _____        | <input type="checkbox"/> Group/Team Performance _____ |
| <input checked="" type="checkbox"/> Home Work _____        | <input type="checkbox"/> Other _____                  |

**3. Assessment of Student Achievement:**

|   |  |
|---|--|
| <input type="checkbox"/> Departmental Exam _____    | <input checked="" type="checkbox"/> Pre-test/Post-test _____ |
| <input type="checkbox"/> Follow-on Tracking _____   | <input type="checkbox"/> Simulations _____                   |
| <input type="checkbox"/> Standardized Test _____    | <input type="checkbox"/> Comprehensive Project _____         |
| <input type="checkbox"/> Portfolio Assessment _____ | <input type="checkbox"/> Other _____                         |

**F. EQUIPMENT, FACILITIES, TEXTS, MATERIALS, AND SUPPLIES**

**1. Special Equipment/Facilities :**

|  |   |
|--|---|
| <input type="checkbox"/> Lab equipment _____         | <input type="checkbox"/> ITV Classroom _____    |
| <input type="checkbox"/> Computer Lab _____          | <input type="checkbox"/> Off-Campus Sites _____ |
| <input type="checkbox"/> CD ROM's _____              | <input type="checkbox"/> Testing Center _____   |
| <input type="checkbox"/> Data Projector/Screen _____ | <input type="checkbox"/> Other _____            |
| <input type="checkbox"/> VCR _____                   | <input type="checkbox"/> Other _____            |
| <input type="checkbox"/> TV Monitor _____            | <input type="checkbox"/> Other _____            |

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**2. Texts:**

Title: UA material supplied by local 190

Author: \_\_\_\_\_ Copyright Yr: \_\_\_\_\_

Publisher: \_\_\_\_\_ Est. Cost: \_\_\_\_\_

Title: \_\_\_\_\_

Author: \_\_\_\_\_ Copyright Yr: \_\_\_\_\_

Publisher: \_\_\_\_\_ Est. Cost: \_\_\_\_\_

Title: \_\_\_\_\_

Author: \_\_\_\_\_ Copyright Yr: \_\_\_\_\_

Publisher: \_\_\_\_\_ Est. Cost: \_\_\_\_\_

Title: \_\_\_\_\_

Author: \_\_\_\_\_ Copyright Yr: \_\_\_\_\_

Publisher: \_\_\_\_\_ Est. Cost: \_\_\_\_\_

Additional Texts:

**3. Supplies and/or Uniforms students will have to Acquire:** (e.g. calculators, uniforms, tools, etc.)

| Descriptions | Cost Estimates |
|--------------|----------------|
| _____        | _____          |
| _____        | _____          |
| _____        | _____          |

**4. Reference Materials that will be used:** (e.g. journals, books, manuals, maps, LRC reserves, etc.)

| Title/Name | Location |
|------------|----------|
| _____      | _____    |
| _____      | _____    |

**5. Computer Software that will be used:**

| Title/Name | Location |
|------------|----------|
| _____      | _____    |
| _____      | _____    |
| _____      | _____    |

**6. Audio/Visual Materials that will be used:** (e.g. films, video tapes, slides, audio tapes, CDs, etc.)

| Title/Name                   | Location |
|------------------------------|----------|
| <u>Supplied by Local 190</u> | _____    |
| _____                        | _____    |
| _____                        | _____    |

**Course:** APP 243

**Title:** Medium Temperature Refrigeration Systems

**Course**

**Description:** This class is designed to help students understand medium temperature systems. The class focuses on where medium temperature systems are used and demonstrates how to set up controls on a medium temperature system. Students will be expected to troubleshoot a medium temperature system.

## **Outline**

- I. **Medium Temperature Refrigeration**
  - A. The student will define medium temperature systems
  - B. The student will describe when medium temperature systems are used
  
- II. **Components of Medium Temperature Refrigeration**
  - A. The student will list and describe the components that make up the medium temperature refrigeration systems
  - B. The student will demonstrate the processes of setting up controls on a medium temperature refrigeration system.
  - C. The student will describe and demonstrate the differences between “walk-in” and “reach” systems
  
- III. **Systems in Medium Temperature Refrigeration**
  - A. The student will describe and demonstrate proper thermal expansion valve setting operations and systems
  - B. The student will describe and demonstrate the proper set up of evaporator pressure regulating valves

- C. The student will describe the functions of a medium temperature rack system
- D. The student will describe a multiple evaporator system
- E. The student will define the process of heat recovery in a rack system

**IV. CFC's used in Medium Temperature Refrigeration**

- A. The student will list the freon's used in Medium Temperature Refrigeration Systems
- B. The student will demonstrate the processes of changing freon's in various systems
- C. The student will identify various oils used in compressors for different freon's

**V. Condensate and Medium Temperature Refrigeration Systems**

- A. The student will define and discuss defrost systems and timers
- B. The student will discuss the process and functions of condensate evaporator heater pans
- C. The student will discuss the requirements of condensate drain piping for coolers and freezers
- D. The student will demonstrate competency in heat trace taping