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| UNIVERSITY OF TECHNOLOGY AND EDUCATION HCM CITY**FACULTY OF VEHICLE AND ENERGY ENGNEERING**  | **Program:** ThermalEngineering Technology**Level: Bachelor** |

**COURSE SYLLABUS**

1. **Course name:** Refrigeration Technique Practice 4 **Course code:** RETP332432
2. **Credits:** 3 (0/3/6) (0 theory credits, 3 practice credit)
3. **Lecturers:**

1/ Main lecturer: Le Xuan Hoa, PhD

2/ Teaching Lecturers: MSc., Lai Hoai Nam; MSc., Nguyen Le Hong Son; Doan Minh Hung

1. **Required course**

Required courses: no

Pre-courses: Compressors and refrigeration equipments

1. **Course Description**

 This course equips learners with practical knowledge about the operation, test, diagnose and troubleshoot common failures for industrial refrigeration systems such as cold storage system, frozen system, water chiller air conditioning system, etc.

This course will also equip skills for learners to operate, test, diagnose and troubleshoot industrial refrigeration systems.

1. **Course Goals**

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| ***Goals*** |  **Course Objectives***(The content of the course includes the academic knowledge:)* | **ELOs** |
| **G1** | Specialized knowledge about the operation, test, diagnose and troubleshoot common failures for industrial refrigeration systems | ELO 3 |
| **G2** | Experimenting and having professional skills about the operation, test, diagnose and troubleshoot common failures for industrial refrigeration systems | ELO 4, ELO 6, ELO 8 |
| **G3** | Being able to lead, function, and communicate in teams | ELO 9 |
| **G4** | Operation, test, diagnose and troubleshoot common failures for industrial refrigeration systems | ELO 14 |

1. **Expected learning outcomes**

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| **Course objectives** | **Description** *(After studying this course, student will be able :)* | **ELOs** |
| **G1** | **G1.1** | Summarizing specialized knowledge about the operation, test, diagnose and troubleshoot common failures for industrial refrigeration systems | **ELO 3** |
| **G2** | **G2.1** | Creating professional ethics and professional working manner | **ELO 4** |
| **G2.2** | Showing and comparing experimental dataabout the operation, test, diagnose and troubleshoot common failures for industrial refrigeration systems | **ELO 6** |
| **G2.3** | Applying work in team for discussing and solving the problems related to the operation, test, diagnose and troubleshoot common failures for industrial refrigeration systems | **ELO 8** |
| **G3** | **G3.1** | Applying communication in writing and speaking forms | **ELO 9** |
| **G4** | **G4.1** | Applying professional skills in operation, test, diagnose and troubleshoot common failures for industrial refrigeration systems | **ELO 14** |

1. **Texbooks**

**-** Texbooks:

[1] Le Xuan Hoa, Hoang An Quoc, Dang Thanh Trung, and Le Minh Nhut, Refrigeration Technique Practice 4, HCMUTE 2016

- Reference books:

[2]. Shan K. Wang, **Handbook of Air Conditioning and Refrigeration**, McGraw – Hill 2001

 [3]. Ibrahim Dincer, **Refrigeration systems and applications**, John Wiley & Sons, 2003.

1. **Assessment:**

- Grading Scale: **10**

- Assesement plans:

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| **Assesement method** | **Content**  | **Week**  | **Assessment tool** | **ELO** | **Percent (%)** |
| Practical Test 1 | Operating water chiller systemRequirements: skill assessment and checking operating parameters | Week 1 | Skill assessment/Rubrics | 3, 4, 6, 8, 9, 14 | 20% |
| Practical Test 2 | Operating cold storage systemRequirements: skill assessment and checking operating parameters | Week 2 | Skill assessment/ Rubrics | 3, 4, 6, 8, 9, 14 | 20% |
| Practical Test 3 | Operating frozen systemRequirements: skill assessment and checking operating parameters | Week 3 | Skill assessment/ Rubrics | 3, 4, 6, 8, 9, 14 | 20% |
| Practical Test 4 | Operating ice maker systemRequirements: skill assessment and checking operating parameters | Week 4 | Skill assessment/ Rubrics | 3, 4, 6, 8, 9, 14 | 20% |
| Practical Test 5 | Maintenance and repair for heat exchangers Requirements: skill assessment and checking operating parameters | Week 5 | Skill assessment/ Rubrics  | 3, 4, 6, 8, 9, 14 | 20% |

1. **Course content:**

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| **Week**  | **Content**  | **ELOs** |
| 1 | ***Lesson 1:* Operating water chiller system** <0/30/60> |  |
| ***A/* Contents and teaching methods in class***: (30)***Practice teaching contents:** + Detail principle diagram of the system + Operating system + Supplying and recovering refrigerants; adding oil for the system + Adjusting parameters of the system + Finding and repairing pans  + Assembling several equipments of the system  + Checking**Teaching methods**:* Presentation
* Serving as a model
* Team working
 | 3, 4, 6, 8, 9, 14 |
| ***B/*****Contents for seft-study at home**: *(60)* + Reading catalogues about operating water chiller system  + Reading about supplying and recovering refrigerants; adding oil for the system + Drawing detail principle diagram of the system*Listing take notes for this course:* + Le Xuan Hoa, Hoang An Quoc, Dang Thanh Trung, and Le Minh Nhut, Refrigeration Technique Practice 4, HCMUTE 2016 | 3, 4, 6, 8, 9, 14 |
| 2 | ***Lesson 2:* Operating cold storage system** <0/30/60> |  |
| ***A/* Contents and teaching methods in class***: (30)***Practice teaching contents:** + Detail principle diagram of the system + Operating system + Supplying and recovering refrigerants; adding oil for the system + Adjusting parameters of the system + Finding and repairing pans  + Assembling several equipments of the system  + Checking**Teaching methods**:* Presentation
* Serving as a model
* Team working
 | 3, 4, 6, 8, 9, 14 |
| ***B/*****Contents for seft-study at home**: *(60)* + Reading catalogues about operating cold storage system  + Drawing detail principle diagram of the system*Listing take notes for this course:* + Le Xuan Hoa, Hoang An Quoc, Dang Thanh Trung, and Le Minh Nhut, Refrigeration Technique Practice 4, HCMUTE 2016 | 3, 4, 6, 8, 9, 14 |
| 3 | ***Lesson 3:* Operating frozen system** <0/30/60> |  |
| ***A/* Contents and teaching methods in class***: (30)***Practice teaching contents:** + Detail principle diagram of the system + Operating system + Supplying and recovering refrigerants; adding oil for the system + Adjusting parameters of the system + Finding and repairing pans  + Assembling several equipments of the system  + Checking**Teaching methods**:* Presentation
* Serving as a model
* Team working
 | 3, 4, 6, 8, 9, 14 |
| ***B/*****Contents for seft-study at home**: *(60)* + Reading catalogues about operating frozen system  + Drawing detail principle diagram of the system*Listing take notes for this course:* + Le Xuan Hoa, Hoang An Quoc, Dang Thanh Trung, and Le Minh Nhut, Refrigeration Technique Practice 4, HCMUTE 2016 | 3, 4, 6, 8, 9, 14 |
| 4 | ***Lesson 4:* Operating ice maker system** <0/30/60> |  |
| ***A/* Contents and teaching methods in class***: (30)***Practice teaching contents:** + Detail principle diagram of the system + Operating system + Supplying and recovering refrigerants; adding oil for the system + Adjusting parameters of the system + Finding and repairing pans  + Assembling several equipments of the system  + Checking**Teaching methods**:* Presentation
* Serving as a model
* Team working
 | 3, 4, 6, 8, 9, 14 |
| ***B/*****Contents for seft-study at home**: *(60)* + Reading catalogues about operating ice maker system  + Drawing detail principle diagram of the system*Listing take notes for this course:* + Le Xuan Hoa, Hoang An Quoc, Dang Thanh Trung, and Le Minh Nhut, Refrigeration Technique Practice 4, HCMUTE 2016 | 3, 4, 6, 8, 9, 14 |
| 5 | ***Lesson 5:* Maintenance and repair for heat exchangers** <0/15/30> |  |
| ***A/* Contents and teaching methods in class***: (15)***Practice teaching contents:** + Condensers and evaporators  + Evaporative heat exchangers + Air heat exchangers + Checking**Teaching methods**:* Presentation
* Serving as a model
* Team working
 | 3, 4, 6, 8, 9, 14 |
| ***B/*****Contents for seft-study at home**: *(30)* + Reading catalogues about maintenance and repair for heat exchangers *Listing take notes for this course:* + Le Xuan Hoa, Hoang An Quoc, Dang Thanh Trung, and Le Minh Nhut, Refrigeration Technique Practice 4, HCMUTE 2016 | 3, 4, 6, 8, 9, 14 |

1. **Classroom rules of conduct:**

Students must do reports and homeworks by themselves. Student will be received zero score if he (or she) violates study regulations or ethics.

1. **Approved date:**
2. **Approvers:**

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| **Dean** | **Head of department** | **Authors** |
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1. **Syllabus update:**

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| **Time #1: Upgraded issues:**  **date/month/year** | **<**updating authors>Head of Department |