**ME 443**

**Principles of Refrigeration**

**2nd Term 2013/2014**

**Mechanical Engineering Department**

**King Saud University**

ME 443 Principles of Refrigeration 3 (2,0,2)

Vapor-compression refrigeration systems: standard cycle and its modification, compressors, condensers, evaporators, expansion devices, system analysis, multipressure systems; Absorption refrigeration systems: Lithium-Bromide system, cycle and improvements, combined systems; Aqua-Ammonia systems.

**Number of Credits: (2,2,0)**

**Class/Laboratory Schedule**

Two 50-minute lecture sessions, two 50- minute lab sessions per week.

**Prerequisites by Course:** ME *374* Thermodynamics II

**Textbook(s)/ Required Material:** Refrigeration and Air Conditioning,W. F. Stoecker and J. W. Jones, McGraw-Hill Book Co.

**References:** ASHRAE Handbook (Fundamentals volume) and Modern Air Conditioning Practice, N. Harris, McGraw-Hill Book Co.

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| **1. Topics to be Covered** | | |
| **List of Topics** | **No of Weeks** | **Contact hours** |
| Introduction and applications of refrigeration | 1 | 2 |
| Vapor-compression cycle | 1 | 2 |
| Compressors | 2 | 4 |
| Condensers and evaporators | 2 | 4 |
| Expansion devices | 1.5 | 3 |
| Vapor-compression system analysis | 1.5 | 3 |
| Refrigerants: ozone depletion and new refrigerants | 1.5 | 3 |
| Multi-pressure systems. | 1.5 | 3 |
| Absorption Refrigeration Systems | 1 | 2 |
| Lithium Bromide absorption system | 1 | 2 |
| Aqua-Ammonia absorption system | 1 | 2 |

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| **List of Lab Experiments** | **No of Weeks** | **Contact hours** |
| 1. Introduction the refrigeration lab | 1 | 2 |
| 1. Operation of vapour compression refrigeration system | 1 | 2 |
| 1. Evaluation of the Coefficient of Performance of a 2. Vapor Compression System | 1 | 2 |
| 1. Study of the Effect of Cooling Water Flow Rate 2. On Condenser and Refrigeration System Performance | 1 | 2 |
| 1. Effect of Evaporating Temperature on the 2. Performance of the Vapor Compression System | 1 | 2 |
| 1. Compressors types demonstration. | 1 | 2 |
| 1. Expansion devices demonstration | 1 | 2 |
| Midterm 1 lab exam | 1 | 2 |
| 1. Operation of multi-pressure refrigeration system | 1 | 2 |
| 1. Study performance of multi-pressure refrigeration system | 1 | 2 |
| 1. Absorption system demonstration | 1 | 2 |
| 1. Diagnosis of faults of refrigeration system 1 | 1 | 2 |
| 1. Diagnosis of faults of refrigeration system 2 | 1 | 2 |
| Midterm 2 lab exam | 1 | 2 |

**Contribution to Meeting the Professional Component:**

Engineering Topics

**Science/Design Contents:**

2.5/0.5

**Assessment Tools**

Final Examination: 40%

Experimental Work (Lab) Reports: 10%

Two Mid-term Tests: 30%

Two Lab exams: 20%

**Prepared by**

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