

Course Book

- **Course overview:**

The design of this module includes establishing improving the student's knowledge and understanding about the Refrigeration to provide the student realistic applications encountered in professional practice. The topics of this module includes : basic concepts of refrigeration systems, refrigerants and refrigeration cycles, evaluating the coefficient of performance, using diagrams and charts determination of cooling load for cold storages.

. The module will be delivered via lectures in both theoretical and practical side

- **Course objective:**

- Understand the theory of refrigeration to tackle real live engineering problems
- Apply principles of thermodynamics to solve refrigeration cycles problems.
- Involve in team working and collaborate with colleagues.

- **Student's obligation**

To pass this module the students should attend all lectures and complete all tests, exams and assignments.

- **Forms of teaching**

-Oral presentations lectures, Group discussions, Seminars, Problem-solving based learning, Project based learning

- **Assessment scheme**

2% In Class Activity

14% Homework

24% Report, Seminar, Project

4% Quiz

16% Mid Semester (Theory) exam

40% Final (theory) exam

- **Specific learning outcome:**

On successful completion of this module the learner will be able to:

1. **Recognize** basic concepts of engineering mechanics
2. **Identify** all types of refrigeration cycles and **analyze** their components
3. **Determine** and **apply** concepts of thermodynamics
4. **Develop** and **sketch** the cycle for better understanding
5. **Determine** all cycle characteristics
6. **Apply** fluid mechanics concepts in refrigeration piping design
7. **Collaborate** with others to solve problems by group or team working.

- **Course Reading List and References:**

Handbook of Air Conditioning and Refrigeration (Second dition)

- Shan K. Wang

Air Conditioning Engineering

- W.P.Jones

Basic Refrigeration and Air Conditioning (Third edition)

- P N Ananthanaryanan

الموسوعة العالمية للتكييف و التبريد

- ريكس ميلر – مارك ميلر

مبادئ هندسة تكييف الهواء والتثليج

الدكتور خالد احمد الجودي

Fundamentals of Engineering Thermodynamics

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| Course topics (Theory) | Week |
|---|----------------|
| Introduction | Week 1 |
| Basic definitions , Refrigerants and their properties, uses , numbering | Week 2 |
| Theoretical vapor compression refrigeration cycle | Week 3 |
| Actual vapor compression refrigeration cycle , calculation of components capacity, C.O.P. | Week 4 |
| Evaporator selection | Week 5 |
| Condenser selection | Week 6 |
| Midterm Examination | Week 7 |
| Midterm Examination | Week 8 |
| Compressor selection, calculation of mechanical and volumetric efficiency | Week 9 |
| Thermal equilibrium of refrigeration cycle | Week 10 |
| Cascade refrigeration cycles\multi compressors | Week 11 |
| Cascade refrigeration cycles\multi evaporators | Week 12 |
| Cascade refrigeration cycles\with heat exchanger and flash intercooler | Week 13 |
| Vapor absorption refrigeration cycles | Week 14 |
| Final Examination | Week 15 |
| | Week 16 |
| Practical Topics (If there is any) | Week |
| Calculating the coefficient of performance for an educational refrigerator (COP) | Week 1 |
| Calculate the condenser capacity Q_c | Week 2 |
| Thermal equilibrium for educational refrigerator | Week 3 |
| The total heat transfer coefficient between water and gas in the condenser and the evaporator | Week 4 |
| The effect of temperature of evaporator and condenser on the amount of heat of evaporator and condenser | Week 5 |
| Cooling and dehumidification | Week 6 |
| Relationship between (P_c / P_e) and the amount of heat of condenser and evaporator | Week 7 |
| Relationship between temperature and pressure | Week 8 |
| Sensible and latent heat | Week 9 |

- **Examinations (question design):**

The following is an example of the examination questions:

Extra notes: no notes

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External Evaluator :

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