NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF MECHANICAL ENGINEERING
MECHANICAL ENGINEERING PROGRAM

MN374 – REFRIGERATION AND AIR CONDITIONING

I. GENERAL INFORMATION

CODE	: MN374 Refrigeration and Air Conditioning
SEMESTER	: 9
CREDITS	: 3
HOURS PER WEEK	: 4
PREREQUISITES	: Heat and mass transfer – Heat Trasnfer
CONDITION	: Compulsory

II. COURSE DESCRIPTION

Introduction: Definitions, Refrigeration and air-conditioning applications. Applications. Refrigeration methods. Refrigerants: Definition. Classification. Main and secondary refrigerants. Properties. Selection of a refrigerant. Theoretical, real and multiple pressure compression cycle. Cascade systems. Absorption cooling cycle. Application problems. Projects of cold rooms. Thermal loads. Dimensioning cold rooms. Capacity and selection of components. Balance of refrigeration equipment. Application example.

Fundamentals of Air Conditioning. Sychrometry: Definitions, Air conditioning processes, classification, main systems, components. Air Conditioning Systems Projects: Study of the premises, design conditions. Calculation of loads. Application example. Design of air distribution systems. Types of systems supply and distribution of air. Methods of calculating ducts. Application example.

III. OBJECTIVE

Students, at the end of the course, using tables and / or refrigerant properties diagrams, Software (EES), as well as manufacturers' catalogs, will design air conditioning and / or refrigeration systems and / or equipment; Justifying the method chosen; Properly calculating and selecting components; Providing for its installation and maintenance; Elaborating the respective plans.

IV. LEARNING UNITS

1. INTRODUCTION

Definitions. Applications of refrigeration and air conditioning. Classification of refrigeration. Refrigeration methods**.**

2.REFRIGERANTS

Refrigerants. Definition. Classification. Refrigerants: principal and

secondary. Properties. Selection of a refrigerant.

3. THE STEAM COMPRESSION REFRIGERATION CYCLE (PART ONE)
Theoretical, real vapor compression cycle and multiple pressures. Cascade systems. Absorption refrigeration cycle. Application problems.

4. THE REFRIGERATION CYCLE FOR STEAM COMPRESSION (SECOND PART)
Main components of a vapor compression refrigeration system. Applications.

5. THE REFRIGERATION CYCLE FOR VAPOR COMPRESSION (THIRD PART)
Accessories of a system of refrigeration by compression of steam. Applications. Types.

6. REFRIGERATION PLANT PROJECTS (PART ONE)
Thermal loads. Dimensioning of cold rooms. Calculation of capacity.

7. REFRIGERATION PLANT PROJECTS (PART TWO)
Selection of components of a refrigeration system. Balance of a refrigerator. Examples of application.

8. AIR CONDITIONING FUNDAMENTALS
Psychometrics: Definitions, Air Conditioning Processes, classification, main systems, components.

9. CONDITIONING PROJECTS (PART ONE)
Air Conditioning Systems. Classification.

10. CONDITIONING PROJECTS (PART TWO)
Study of the premises, conditions of design. Process in room.

11. CONDITIONING PROJECTS (PART THREE)
Calculation of loads in winter. Example of application.

12. CONDITIONING PROJECTS (PART FOUR)
Calculation of loads in winter. Example of application.

V. LABORATORY AND PRACTICAL EXPERIENCES

Conducted practices will be conducted prior to taking qualified practices.

VI. METHODOLOGY

The classes will be theoretical expositions of the fundamentals and criteria for the design of cooling and air conditioning systems. With examples applications on calculation and design of systems of

refrigeration and Air Conditioning as well as on the selection of its components.

VII. EVALUATION FORMULA

System: F

Partial Exam 25%
Final Exam 50%
Monography 25%

* In all assessments, student participation in class will be taken into account.

VIII. BIBLIOGRAPHY

1. Refrigeration and Air Conditioning. W. F. Stoecker. Ed. MC. Graw Hill New York 1965.

2. Principles of Refrigeration. Roy Dossat. Ed. Cecsa. Mexico 1968.

3. Refrigeration principles and systems. Edward G. Pita. Ed. Limusa. New York 1971.

4. Manual of Air Conditioning. Carrier International Limited. Ed. Marcombo. Barcelona 1972.

5. Automatic Cooling. Alarcón Creus.Ed. Marcombo. Barcelona 1972.

6. Ashrae Handbook: Fundamentals. YES. Edition. Atlanta. 2001. http: www.ashrae.org.

7. Air Conditioning. Angel Luis Miranda. Ed.Ceac, Barcelona 2004.

8. Heating, Ventilation and Air Conditioning. Mc Quiston -Parker - Spliter. Ed. Limusa Wiley. Mexico 2008.

9. Basics of Air Conditioning and Refrigeration. Hernández Goribar. Ed.