**Refrigeration and air conditioning (IVth Year of study, VIIth SEMESTER)**

**Credit value (ECTS) 4**

**Course category**

Specialized subject (compulsory)

**Discipline Code**: A.EMIAIA.S.411

**Course holder**

**PhD. Lecturer Virgil VLAHIDIS**

**Discipline objectives (course and practical works)**

The aim of the course is to provide students with a basic understanding of thermodynamics, cooling systems (especially vapor-compression cooling systems) and air conditioning systems.

Practical aspects of the construction, operation and sizing of refrigeration systems are presented.

 **Contents (syllabus)**

|  |
| --- |
| **Course (Chapters/subchapters)** |
|  **Thermodynamics**. Parameters of state. Thermodynamic transformations. |
|  **Mechanical work and heat**. |
|  **Ideal gas transformations**. Ideal gases. |
|  **Principles of thermodynamics.** |
|  **Compressors.** The ideal compressor. Technical (dead-space) compressor. Step compression. |
|  **Compressors for refrigeration.** |
|  **Refrigerants.** |
|  **Refrigerating systems. Refrigerating systems with one-stage mechanical vapor compression.** |
|  **Refrigerating systems with mechanical vapor compression in stages.** |
|  **Carbon dioxide mechanical compression refrigeration**  **systems.** |
|  **Absorption refrigeration systems.** |
|  **Cooling systems with intermediate fluids.** |
|  **Humid air.** |
|  **Air conditioning systems.** |

|  |
| --- |
| **Practical works** |
|  |
| **Presentation of the Refrigeration and Air Conditioning Installations laboratory**; work safety rules. |
| **International System of Units.** |
| **Temperature and pressure measurements.** |
| **Determining the of air adiabatic exponent.** |
| **Refrigerant compressors**. |
| **Construction and operation of vapor-compression refrigeration systems.** |
| **The split-type air conditioning system.** |
| **Determination of atmospheric air humidity.** |
| **Project. Dimensioning the refrigeration installation for a cold room.**Determining cold requirements. |
| Calculation of refrigeration plant parameters. |
| Choosing the compressor condenser unit of the refrigeration plant. |
| Choosing the refrigeration plant evaporator. |
| **Final colloquium of knowledge evaluation** |

**References**

1. Eugenia Stăncuț, Alexandru Dima, Cerban Madalina, Cernaianu Corina Dana, 2018- THERMOTECHNICS AND THERMAL EQUIPMENT - Laboratory Manual, Editura Universitaria, pages: 160 ISBN: 978-606-14-1370-6

2. Rosca R. Refrigeration and air conditioning installations (2nd ed.). Edit. Alfa, Iași, 2011.

3. Rosca R. Basics of artificial cold production. Ed. "Ion Ionescu de la Brad", 2013.

4. R. Rosca, **V. Vlahidis**, 2018- REFRIGERATION AND AIR CONDITIONING INSTALLATIONS, Laboratory guide, StudIS 2018, ISBN 978-606-48-0059-6.

**Evaluation**

|  |  |  |
| --- | --- | --- |
| **Evaluation form** | **Evaluation Methods** | **Percentage of the final grade** |
| Exam | Oral examination | 60% |
| Appreciation of the activity during the semester | Oral assessment during the semester, verification tests and final laboratory colloquium. | 40% |

**Contact**

**PhD. Lecturer Virgil VLAHIDIS**

Faculty of Agriculture - USV Iași

3 Mihail Sadoveanu Alley, Iaşi, 700490, Romania

Phone: +40 232 407 557 557

Fax: +40 232 260 650

E-mail: virgil.vlahidis@iuls.ro Assessment methods Percentage of final mark̆