

Sheet course ()

Course	MSc IN MECHANICAL ENGINEERING		
Unit	Cooling Plants	Mandatory	<input type="checkbox"/>
		Optional	<input checked="" type="checkbox"/>
Unit scientific area	Thermofluids and Energy	Category	C

Unit category: B - Basic; C - Core Engineering; E - Specialization; P - Complementary.

Year: 1st	Semester: 2nd		ECTS: 5,0			
Contact time	Total: 45.0	T:	TP: 45,0	PL:	S:	OT:

T - Lectures; TP - Theory and practice; PL - Lab Work; S - Seminar; OT - Tutorial Guidance.

Unit Director	Title	Position
João Nuno Pinto Miranda Garcia	Ph.D.	Invited Assistant Professor

Learning Objectives (knowledge, skills and competences to be developed by students)

(max. 1000 characters)

The curriculum programmatic UC Cooling Plants aims to provide a set of normative elements, technical and scientific allowing the Master's stay enabled with skills to develop projects and professional activities in the field of industrial refrigeration and industrial sectors of meat, milk, fish, fruit and vegetable with incidence for establishments with agro-industrial activity designed to treat and preserve perishable food products in refrigerated spaces, an overview of optimization and energy efficiency of refrigeration means and structures.

Syllabus

(max. 1000 characters)

- 1 . Food chain and cold chain
- 2 . Industrial refrigeration integrated on industrial infrastructure in different sectors of agro - industrial, namely, meat, fish , milk , poultry , fruit and vegetable
- 3 . Water activity and the nature of refrigerated and frozen products and maintenance factors of perishable foodstuffs and technology of processing and preserving products such as design parameters and design of refrigeration facilities
- 4 . Heat balance in cold stores , based on the product , in infrastructure , in isothermia of refrigeration facilities , handling and moving products and the thermodynamic characteristics of the air
- 5 . Factors and structural design of an infrastructural project of refrigeration facilities integrated in agro-industrial units , with securing palletized or airways

6 . Characteristics , classification and systems of transport refrigeration , including vehicles , containers and fishing vessels

Demonstration of consistency of the syllabus with the objectives of the course

(max. 1000 characters)

The syllabus is totally fit the general and specific objectives of the course that are targeted for industrial refrigeration units that are integrated into the agro-industrial sector of perishable foodstuffs.

The content also support, both in structural, operational, organizational, production and management, materials which transmit knowledge to design and draft refrigeration facilities integrated, namely, fruit plants, abattoirs, slaughterhouses and poultry rabbits, industrial kitchen, dairy , fish, fish markets and cold stores and even logistical resources associated with such activity, as is the case of fisheries factory ships, freezer vessels, fishing vessels, refrigerated vehicles and rail cars and reefers.

Teaching methodology (evaluation included)

(max. 1000 characters)

The methodology and techniques of imparting knowledge and science of industrial cold logic are adapted to foster the future engineer the concept of rational design and optimal operation of refrigeration facilities , in the economic - financial , thermal energy and technical- technological.

This concept requires that the future professional engineering consider the primates and the principles of eco - efficiency of refrigeration facilities, including fixed and mobile, both in terms of energy efficiency, rational use of energy or the economy and energy management of refrigeration facilities, a universal vision that concerns the all society.

The rating reflects this methodology a timeline for application design and dimensioning of refrigeration facilities , so it is held in two phases , one in two frequencies of continuous assessment, with the same weight, and the second time a exam.

Demonstration of consistency of teaching methods with the learning objectives of the course

(max. 3000 characters)

The course aims to develop skills and impart knowledge of science and technology of industrial cooling , following the rules of the International Institute of Refrigeration and the rules of art in place, based on the application and practice .

By integrating training courses directed at other side but framed in the same thematic area of termofluidos and energy , while absorbing other subjects more universal , it is intended in this way to allow the student to complete training in the engineering of industrial refrigeration by this integration logic and rationals .

In parallel is critical to emphasize the importance of thermodynamic and matematical calculation associated with the project and the design methodologies which makes the unit consistent with the learning objectives in the vertical and horizontal knowledge engineering solution which they determine the most rational and appropriate to the environmental aspects and energy.

Main Bibliography

(max. 1000 characters)

ANQUEZ, M. e BENEZIT, A, "La conservation par le froid des poissons, crustácees et mollusques"

COLLIN, Daniel, "Aplications Frigorifiques"

DANZEAU, M, "Etude et conception des entrepots frigorifiques"

GAC, A, "Conception et exploitation des entrepots frigorifiques"

JOHNSTON, W A, NICHOLSON, F J, ROGER, A, STROUD, G D, "Congelação, refrigeração e armazenamento na indústria de pesca

MONVOISIN, A, "Conservation por el frio"

POHLMANN, "Formulaire du frigoriste"

PIETTRE, Maurice, "Introduction aux diverses techniques de conservation des denrées périssable"

FAO, "Freezing and refrigerated storage in fisheries"

Institut International du Froid, "Pratical Guide to refrigerated storage", "Recommandations pour la preparation et la distribution des aliments congelés", "Conditions reconmandés pour la conservation des produits perissables a l'état réfrigéré", "Stations de conditionnement et entreposage de fruits et legumes", « Conditions recommandées pour le transport terrestre des denrées perissab