# .- Food Technology Processes I

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***Text under revision. Not yet approved by academic staff.***

COURSE AIMS AND INTENDED LEARNING OUTCOMES

The course aims to provide students with the basic notions relating to the principles of food preservation and processing, with application references to some products, and the basic notions relating to the role of food packaging and the materials used.

At the end of the course, students will know the method for calculating the lethality of a heat treatment; the problems underlying the preservation of raw materials and processed products at low temperatures; the critical aspects of process and preservation in dehydrated products; the technologies used in the food industry for separation processes; the principal processing phases for the production of ingredients, semi-finished and finished products in the confectionery and cereal derivatives and pseudo-cereals sectors. Students will also know the main materials used for food packaging, together with their respective main properties, critical issues and applications, along with some notes on the current European legislation governing materials and objects intended to come into contact with food.

Based on the knowledge acquired, students will be able to identify the key parameters for controlling the processes of production, preservation and processing of food and food products, the use of sanitisers, the use of the psychrometric diagram, pH control, and the application of the protective atmosphere. Students will be able to calculate the lethality of a heat treatment according to the type of food, the process and the plants used. Students will be able to evaluate the technological role of the different processing phases of a process, by correlating the effect of the processing parameters set with the quality parameters of the final products, and evaluating the margins for improvement and innovation of the technologies currently used in the food industry. Finally, students will be able to evaluate which packaging material solutions to choose according to the needs of the food product.

COURSE CONTENT

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|  | ECTS |
| General part Food Technologies | 1.0 |
| Introduction to food technologies and food technology processes. Heat treatments of foods (principles, pasteurisation systems, and commercial scalding and sterilisation). |  |
| Cold storage (refrigeration and freezing). |  |
| Applied section | 1.0 |
| Overview of raw materials – ingredients – additives, processes and shelf-life aspects for certain production lines: cereals and derivatives (starches, flours, pasta and bakery products), industrial ice cream, aseptically canned tuna; confectionery products. |  |
| Food packaging | 2.0 |
| Purposes and characteristics of food packaging. Chemical and physical properties of packaging materials. Systematics of materials and objects for food packaging. Rigid and flexible packaging. Eco-friendly packaging. Italian and EC regulations concerning materials in contact with food and labelling. |  |
| Practical activities | 1.0 |
| Resolution of numerical problems related to the calculation of heat treatments, dehydration treatments, and reduction of water activity. Possible group work on a number of production lines, and company testimony seminars. |  |

READING LIST

R. Lees, E.B. Jackson Lees, R. London, *Sugar Confectionery and Chocolate Manufacture,* Blackie Academic & Professional, 1973 (9, p. 379).

E.B. Jackson, *Sugar Confectionery Manufacture,* edited by London [etc.], Blackie Academic & Professional, 1990 (23, p. 400).

Cauvan-P. Stanley-L.S. You, *Bakery food manufacture and quality: water control and effects,* Osney, Med., Oxford, Blackwell Science, copyright 2000.

L. Milatovich-G. Mondelli, *La Tecnologia della pasta alimentare,* Chiriotti Editori, Pinerolo, 1990.

R.P. Singh, D.R. Heldman, *Introduction to Food Engineering. Fourth edition*. Academic Press, Burlington USA, 2009.

H. Ramaswamy, M. Marcotte, *Food Processing. Principles and Applications,* Taylor & Francis Group, New York, 2006.

JL Piergiovanni-S. Limbo, *Food Packaging. Materiali,* *Tecnologie e qualità degli alimenti*, Springer, 2010.

Lecturers’ notes.

Aids related to specific topics will be provided during the course.

TEACHING METHOD

1. Theoretical frontal and dialogue-based lectures aimed at presenting the key concepts of the subject.
2. Frontal practical activities involving the assisted solving of numerical problems related to the calculation of heat treatments.
3. Practical activities in the laboratory, during which students work in groups to create a number of model foods related to the applied section of the course, and evaluate the influence of the recipe and manufacturing process on the quality parameters of the final product.
4. Classroom seminars with company testimonials.
5. A possible educational visit to a food company working in one of the production sectors addressed in the applied section of the course.

ASSESSMENT METHOD AND CRITERIA

The exam includes a written part and an oral test, both assessed out of 30 and both contributing equally to the final mark, which will be taken as the arithmetic mean of the marks given.

Written part:

This comprises two types of tests, both marked out of 30 and both contributing equally to the mark for the written part:

* Halfway through the course, a written test will be offered on the programme content covered thus far. The 2-hour test comprises numerical exercises relating to the calculation of heat treatments and a questionnaire with closed questions. In the case of missing answers to questions no marks will be awarded, while incorrect answers may carry penalties. Passing the test exonerates the student from preparing the corresponding part of the programme for the final exam, but it is not to be considered an obstacle to passing the exam itself.
* At the beginning of the course, the possibility of in-person group work will be confirmed. The work groups may consist of a maximum of 5 students, and the contribution and role of each individual member must be explicitly indicated in the final report. In the case of working students or students unable to participate in the group work, this must be communicated to the lecturer at the beginning of the course, who will then be able to offer appropriate alternative methods.

Oral exam:

* At the end of the course, students will have to take an oral test which will focus mainly on the examples and insights covered during the lectures.

Students who do not take or fail to pass the written test, who do not participate in group work, or who choose not to use the mark obtained in the test and its associated partial exemption, will have to take the oral exam on the entire programme indicated in the degree programme Guide, following the reading list indicated therein.

NOTES AND PREREQUISITES

The course requires a knowledge of food chemistry and microbiology, and of food industry facilities.

Information on office hours available on the teacher's personal page at http://docenti.unicatt.it/.