Course guide
390330 - OPA - Food Processing Operations

Last modified: 16/01/2024

Unit in charge: Barcelona School of Agri-Food and Biosystems Engineering
Teaching unit: 745 - DEAB - Department of Agri-Food Engineering and Biotechnology.

Degree: BACHELOR'S DEGREE IN FOOD ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Isabel Achaerandio

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Food engineering and technology: Engineering and basic operations in food industry.
2. Food engineering and technology: Food technology.
3. Food engineering and technology: Processes in food industry.
4. Engineering of agri-food industry: Auxiliary equipments and machinery in agri-food industry.
5. Engineering of agri-food industry: Automation and process control.
6. Engineering of agri-food industry: Waste management and uses of wastes.

Transversal:
7. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

TEACHING METHODOLOGY

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LEARNING OBJECTIVES OF THE SUBJECT

With the follow-up of this subject there is claimed that the student achieves a basic vocabulary and a clear overall view of the stages of the processes of the food processing industry. One tries to introduce the student in the basic concepts of the unitary operations applied to the food production, bearing in mind technologies that allow saving and efficiency of water and of energy between(among) other environmental aspects.
General aims(lenses):
On having finished the subject of basic operations the pupil will be capable of:
· To identify the unitary existing processes in the industry would feed the basic beginning(principles) that govern them.
· To define, to explain and to quantify the most important unitary processes doing special emphasis to the qualit aspects, safety(security) and environment.
· To consider and to solve applied(hardworking) balance sheets(assessments) of matter and energy to evaporating and dryers
· To identify and to indicate the functioning of the principal equipments(teams) of the food processing industry nowadays used.
· To define and to explain the productive process most adapted to obtain a certain food as well as the most viable and suitable alternatives of a technological and environmental point of view.
· To use books, magazines, catalogues specialized in processes to the industry it(he,she) would feed
· To select instruments of measure and control to obtain a major efficiency, a good follow-up and saving of energy in the processes of the food processing industry.

STUDY LOAD

Type	Hours	Percentage
Hours large group	40,0	26.67
Self study	90,0	60.00
Hours small group	20,0	13.33

Total learning time: 150 h

CONTENTS

(ENG) EVAPORACIÓ D'ALIMENTS

Description:
(ENG)Conceptos fundamentales. Tablas de vapor. El evaporador: descripción y tipos. Problemas de funcionamiento. Accesorios. Balances de materia y energía. Evaporación con múltiple efecto. Recompresión térmica del vapor. Recompresión mecánica de vapor.Psicrometría. Isotermas de sorción. Etapas de la deshidratación al aire. Instalaciones y equipos utilizados en la industria (directos, indirectos, por radiación). Criterios de selección. Balance de materia y energia de un secador en continuo. Recirculación del aire. Recalefacción del aire de secado.

Full-or-part-time: 51h
Theory classes: 14h
Laboratory classes: 8h
Self study : 29h

title english

Description:
content english

Full-or-part-time: 66h
Theory classes: 20h
Laboratory classes: 8h
Self study : 38h

FREEZE-DRYING

Description:
Fundamentos de la liofilización. El ciclo de liofilización. Equipos industrialmente utilizados. Controles necesarios.

Related activities:

Full-or-part-time: 16h 30m
Theory classes: 5h
Laboratory classes: 2h
Self study : 9h 30m

MEMBRANE PROCESSES

Description:
content english

Full-or-part-time: 16h 30m
Theory classes: 5h
Laboratory classes: 2h
Self study : 9h 30m

ACTIVITIES

CLASSES D'EXPLICACIÓ TEÒRICA

Full-or-part-time: 98h 20m
Theory classes: 40h
Self study: 58h 20m

PROBLEMS SOLVING

Full-or-part-time: 32h
Laboratory classes: 16h
Self study: 16h

RANKING OF THE BEST EQUIPMENT

Full-or-part-time: 3h 40m
Laboratory classes: 2h
Self study: 1h 40m

LAST EXERCICI AND ORAL PRESENTATION

Full-or-part-time: 16h
Laboratory classes: 2h
Self study: 14h

PROVES INDIVIDUALS D'AVALUACIÓ

Full-or-part-time: 6h
Theory classes: 6h

GRADING SYSTEM

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BIBLIOGRAPHY

Basic:
- Brennan, J.G. Las operaciones de la ingeniería de los alimentos. Zaragoza: Acribia, 1998. ISBN 8420008524.
- Brennan, J.G. Manual del procesado de los alimentos. Zaragoza: Acribia, 2007. ISBN 9788420010991.
- Ibarz, A. Operaciones unitarias en la ingeniería de alimentos [on line]. Madrid: Mundi-Prensa, 2005 [Consultation: 22/12/2022]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=3176272. ISBN 8484761630.
- Casp Vanaclocha, Ana; Abril Requena, José. Procesos de conservación de alimentos [on line]. 2a ed. Madrid: Madrid Vicente: Mundi-Prensa, 2003 [Consultation: 27/10/2022]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=3176331. ISBN 848476169X.
- Fellows, Peter. Tecnología del procesado de los alimentos: principios y prácticas. 2a ed. Zaragoza: Acríbia, 2007. ISBN 9788420010939.
- Singh, R. Paul; Heldman, Dennis R. Introducción a la ingeniería de los alimentos. 2a ed. Zaragoza: Acribia, 2009. ISBN 9788420011240.
- Jafari, Seid Mahdi. Thermal processing of food products by steam and hot water : unit operations and processing equipment in the food industry [on line]. 2023 [Consultation: 11/03/2024]. Available on: https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9780128186169/thermal-processing-of-food-products-by-steam-and-hot-water. ISBN 9780128186169.

Complementary:
- Hermida Bun, J.R. Fundamentos de ingeniería de procesos agroalimentarios. Madrid: Mundi-Prensa, 2000. ISBN 8471149133.
- Hui, Y.H. Handbook of food science, technology and engineering. Boca Raton: Taylor & Francis, 2006. ISBN 0849398479.
- Creus Solé, Antonio. Instrumentación industrial [on line]. 7a ed. Barcelona: Marcombo, 2005 [Consultation: 23/11/2021]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=9767. ISBN 8426713610.
- Kress-Rogers, Erika; Brimelow, Christopher J.B. Instrumentation and sensors for the food industry [on line]. 2a ed. Boca Raton: Cambridge: CRC, 2001 [Consultation: 16/12/2021]. Available on: https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9781855735606/instrumentation-and-sensors-for-the-food-industry. ISBN 084931223X.
- Berk, Zeki. Food process engineering and technology [Recurs electrònic] [on line]. London: Academic Press, 2009 [Consultation: 25/07/2022]. Available on: https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9780123736604/food-process-engineering-and-technology. ISBN 0123736609.
- Raventós Santamaria, Mercè. Industria alimentaria, tecnologías emergentes [on line]. Barcelona: Edicions UPC, 2005 [Consultation: 16/04/2020]. Available on: http://hdl.handle.net/2099.3/36183. ISBN 8483017903.