

Processes and unit operations for the food industry (IIInd Year of study, IIIrd Semester)

Credit value (ECTS) 5

Course category

Domain specialty (Imposed)

Course holder:

Assoc. Prof. Dr. Eng. Petru Marian CÂRLESCU

Discipline objectives (course and practical works)

The aim of the course is to have students acquire knowledge about the processes and unitary operations and operations applied in the food industry. Also of particular importance is the identification of various types of unit operations and appliances in the field of food engineering and the evaluation of technical and functional parameters.

Practical works seek to familiarize students with the unitary operations and the appliances in the technology and operation lines of the agro-food products processing, the recognition of the main sub-assemblies of a device and its operation.

Special emphasis is placed on designing the operation lines specific to a production process.

Contents (syllabus)

Course (chapters/subchapters)
General considerations on subject matter and general principles of unit operations in the food industry.
Principles for balances design: material and energy balances.
Processes and unit operations for the transport of products: transport of liquid products, transport of solid products.
Processes and unit operations for separation by gravity field sedimentation: separation of gas-solid heterogeneous systems, separation of liquid-solid heterogeneous systems, separation of liquid-liquid heterogeneous systems.
Processes and unit operations for separation by filtration: hydrostatic filters, high pressure filters, depression filters; centrifugal field-sedimentation: centrifuges, cyclones
Processes and unit operations for separating solid-solid heterogeneous mixtures: oscillating planar sieves, vibratory sieves, color separators.
Processes and unit operations for grinding products from the food industry: grinding by cutting, grinding, disintegration.
Processes and unit operations for mixing agro-food products: mixing, stirring.
Processes and unit operations for mass and heat transfer in the food industry: drying agro-food products.
Processes and unit operations for heat transfer in the food industry: pasteurization, sterilization.

Practical works
General training for NTN and PSI; substantiating, identifying and customizing unit operations in the agro-food industry.
Processes and unit operations for the agro-food liquid transport.
Processes and unit operations for the gas transport.
Processes and unit operations for the agro-food solid transport.
Processes and unit operations for liquid mixing separation by gravity field sedimentation.
Processes and unit operations for the separation of heterogeneous gaseous mixtures by sedimentation.
Processes and unit operations for the separation of heterogeneous liquid mixtures by filtration.
Processes and unit operations for the separation of heterogeneous liquid mixtures by centrifugal filtration.
Processes and unit operations to separate solid mixtures.
Processes and unit operations for grinding products from the food industry.
Processes and unit operations for drying agri-food products.
Processes and unit operations for the pasteurization and sterilization of agri-food products.
Final colloquium of knowledge evaluation.

Bibliography

1. Amarfi, R. - *Operații unitare*, vol. I, CSIDD, Galați, 2003.
2. Amarfi, R. - *Operații unitare*, vol. II, CSIDD, Galați, 2003.
3. Amarfi, R. - *Fenomene de transfer*, vol. I, Galați, 1989.
4. Banu C., ș.a. – *Manualul inginerului din industria alimentară*, vol I și II , E.T., București 1999
5. Gutulescu I. – *Procese tehnologice moderne din industria conservelor de legume, fructe, carne și pește*, E. D. P., București 1986.
6. Ioancea L. – *Mașini, utilaje și instalații în industria alimentară*, Ed. Ceres, București 1988.
7. Rasenescu I. – *Operații și utilaje în industria alimentară*, Ed. Tehnică, București 1985.
8. Segal Brad – *Tehnologia industrializării fructelor și legumelor*, Ed. Ceres, București 1979.
9. Țenu I. – *Operații și aparate în industria alimentară*, vol.I, operații mecanice, hidrodinamice și aerodinamice, Ed. Ion Ionescu de la Brad Iași, 2008.
10. Țenu I. – *Operații și aparate în industria alimentară*, vol.II, operații cu transfer de căldură și masă, Ed. Ion Ionescu de la Brad Iași, 2014.
11. Cârlescu P. – *Procese și operații în industria alimentară*, vol. I, Ed. PIM Iași, 2016.

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Exam	Writing examination	80%
Appreciation of the activity during the semester	Oral assessment during the semester, verification tests and final laboratory colloquium.	20%

Contact

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