SZKOŁA GŁÓWNA GOSPODARSTWA WIEJSKIEGO

Cutting-edge technologies in food industry

Educational subject description sheet

Basic information

Field of study Food Science - Technology and Nutrition	**Didactic cycle** 2023/24
Speciality -	**Subject code** NoZTNS_D.120.04053.23
Organizational unit Faculty of Food Technology	**Lecture languages** english
Study level first cycle (bachelor's degree)	**Mandatory** Elective subjects
Study form full-time studies	**Block** Major subjects
Education profile General academic	**Disciplines** Food technology and nutrition

Coordinator	Katarzyna Samborska
Teacher	Katarzyna Samborska

Period	**Examination**	**Number of ECTS points**
Semester 6	Pass with grade **Activities and hours** Lecture: 30 Laboratory exercises: 15	3

Goals

Code	Goal
C1	The aim of the course is to broaden students' knowledge of the principles, applications, advantages and limitations of innovative techniques used in food processing and preservation. Classes will cover issues related to: nanotechnology, 3D printing, extrusion, membrane techniques, microencapsulation, non-thermal techniques as well as the acceptance of selected innovative techniques by consumers.

Entry requirements

Student has got basic knowledge in food technology.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	the principles and applications of modern and innovative techniques used in food technology and, in particular, their impact on food quality.	TN_K1_W08	Test (written or computer based)
Skills – Student can:			
U1	gain the data and critically evaluate the effect of modern technology on process performance, product quality.	TN_K1_U06, TN_K1_U09	Report
U2	describe the production process of new type of product in which cutting edge technologies are applied and critically evaluate the consumer acceptance of such solution.	TN_K1_U08	Report

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	Lectures will cover following aspects: the principles and applications of selected non-thermal technologies, nanotechnology, 3D printing, extrusion, membrane technologies and microencapsulation.	W1	Lecture
2.	Within excercises classes students will be familiarized with the impact of selected non-thermal technologies on on progress of unit operations and quality of food and will desing and describe the application of selected cutting-edge technologies for the production of new/invented products or processes. Moreover, they will evaluate the consumer acceptance of designed technology.	U1, U2	Laboratory exercises

Course advanced

Activities	Methods of conducting classes
Lecture	Lecture, E-learning - lecture part
Laboratory exercises	Case study, Problem solving, E-learning - exercises part, Laboratory (experiment), learning by experiment

Activities	Examination method	Percentage
Lecture	Test (written or computer based)	50%
Laboratory exercises	Report	50%

Activities	Credit conditions
Lecture	50% points.
Laboratory exercises	50% points.

Literature

Obligatory

1. Ohlsson, T., Bengtsson, N. (2002). Minimal processing of foods with non-thermal methods. Minimal processing technologies in the food industry. Woodhead Publishing.
2. Xiaojia H., Huey-Min H. (2016). Nanotechnology in food science: Functionality, applicability, and safety assessment. Journal of Food and Drug Analysis, 24, 671-681.
3. Jiao B., Cassano B., Drioli E. (2004). Recent advances on membrane processes for the concentration of fruit juices: a review. Journal of Food Engineering 63 (2004) 303–324.
4. Tiwari A., Jha S.K. (2017). Extrusion cooking technology: Principal mechanism and effect on direct expanded snacks, An overview. International Journal of Food Studies, 6, 113-128.

Optional

1. Feng, H., Barbosa-Canovas G.V., Weiss, J. (2011). Ultrasound technologies for food and bioprocessing, Springer.
2. Barba, F.J, Parniakov, O., Pereiera, S.A., Wiktor, A., Grimi, N., Boussetta, N., Saraiva, J.A., Raso, J., Martin-Belloso, O., Witrowa-Rajchert, D., Lebovka, N., Vorobiev, E. (2015). Current applications and new opportunities for the use of pulsed electric fields in food science and industry. Food Research International, 77, 773-798.
3. Le-Bail A., Chieregato Maniglia B., Le-Bail P. (2020): Recent advances and future perspective in additive manufacturing of foods based on 3D printing, Current Opinion in Food Science, 35, 54-64.
4. Zuidam, N. J., & Nedovic, V. (Eds.). (2010). Encapsulation technologies for active food ingredients and food processing. Springer
5. Other suggested by teacher

Calculation of ECTS points

Activity form	Activity hours*
Lecture	30
Laboratory exercises	15
Preparation for the test	15
Preparing a report	15
Student workload	**Hours** 75
Number of ECTS points	**ECTS** 3

* hour means 45 minutes

Effects

Code	Content
TN_K1_U06	The graduate can obtain, analyze and synthesize the obtained information and draw conclusions taking into account various conditions related to the aspects of human nutrition, food production, including regional production, food evaluation, consumer protection, intellectual property protection, legal, technological, economic, social, and sociological, cultural, ecological and ethical aspects of food production and consumption as well as quality and safety assurance in the food chain and human nutrition
TN_K1_U08	The graduate can plan, organize and carry out, independently or in a team, simple project tasks related to food production and evaluation, human nutrition, and consumer behaviour
TN_K1_U09	The graduate can update knowledge and deepen practical skills in the field of study, taking into account the progress in the development of science and technology, and the need for specific competences in the food production and human nutrition sector
TN_K1_W08	The graduate knows and understands rules and organization methods of the production and chain of food supply (planning, production organization, storage, distribution of food and food consumption in collective and individual nutrition) in accordance with the legal requirements of assurance of quality and food safety and the principles of sustainable development