SZKOŁA GŁÓWNA GOSPODARSTWA WIEJSKIEGO

Physical properties of food

Educational subject description sheet

Basic information

Field of study Food Science - Technology and Nutrition **Speciality** - **Organizational unit** Faculty of Food Technology **Study level** first cycle (bachelor's degree) **Study form** full-time studies **Education profile** General academic	**Didactic cycle** 2023/24 **Subject code** NoZTNS_D.120.04175.23 **Lecture languages** english **Mandatory** Elective subjects **Block** Major subjects **Disciplines** Food technology and nutrition

Coordinator	Sabina Galus
Teacher	Sabina Galus

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 familiarize students with the physical properties of food affecting the quality of food products, methods of their determination or measurement, factors influencing their changes during technological processes. During the course, students learn and determine the physical properties of raw materials and food products on the basis of measurement methods and with the use of laboratory equipment.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	selected physical properties, with particular emphasis on sorption, optical, rheological, electrical and aerodynamic, acoustic, thermal, diffusion and surface properties of selected raw materials of plant and animal origin, as well as the properties of selected raw materials in the form of powders and criteria for assessing their suitability	TN_K1_W03	Written credit, Test (written or computer based)
W2	understands the classification of physical properties of food products, and also understands the methods and equipment used to determine these properties	TN_K1_W04	Written credit, Test (written or computer based)
Skills – Student can:			
U1	observe changes in the physical properties of food, measure selected physical properties of food and perform the necessary quantitative calculations and interpret the obtained results	TN_K1_U01	Report
U2	know how to use knowledge when selecting measurement methods and tools as well as making observations, measurements and calculations in the field of physical properties of food during production and processing	TN_K1_U03	Report
Social competences – Student is ready to:			
K1	recognize the importance of knowledge in the field of physical properties of food and the use of new measurement methods, as well as expanding its scope through the use of various literature sources	TN_K1_K01	Written credit, Report

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	Lectures: Basic physical properties, sorption properties, optical properties, rheological properties, electrical and aerodynamic properties, acoustic properties, thermal properties, diffusion properties, surface properties, properties of powders.	W1, W2, K1	Lecture
2.	Laboratory classes: sorption properties, optical properties, rheological properties, electrical and thermal properties, properties of powders.	U1, U2, K1	Laboratory exercises

Course advanced

Activities	Methods of conducting classes
Lecture	Lecture, Discussion
Laboratory exercises	Discussion, Interpreting the results, Laboratory (experiment), learning by experiment, Observation, Measurement

Activities	Examination method	Percentage
Lecture	Written credit	60%
Laboratory exercises	Test (written or computer based)	20%
Laboratory exercises	Report	20%

Activities	Credit conditions
Lecture	The student must pass the exercises before taking the written exam. The written exam is passed upon obtaining a positive grade, i.e. min. 51% of points.
Laboratory exercises	The student obtains credit for the exercises with a positive grade, i.e. min. 51% of points from test and written reports.

Literature

Obligatory

1. Figura L.O., Teixeira A.A. (2007). Food Physics. Physical Properties - Measurement and Applications. Springer Berlin Heidelberg
2. Serpil Sahin, Servet Gülüm Sumnu. 2006. Physical Properties of Foods. Springer New York, NY
3. Ndob, A.M.; Melas, M.; Lebert, A. Physical-Chemical Properties of Foods: New Tools for Prediction; 2015; pp. 1-98.

Optional

1. Arana, I.I. Physical properties of foods: Novel measurement techniques and applications; 2012; pp. 1-399.
2. Mohammad U. H. Joardder, Monjur Mourshed, Mahadi Hasan Masud. (2015). State of Bound Water: Measurement and Significance in Food Processing. Springer Cham
3. L.L. Schramm. (2006). Emulsions, Foams, and Suspensions. Fundamentals and Applications. Wiley-VCH. Weinheim
4. Sarkar, T.; Salauddin, M.; Kirtonia, K.; Pati, S.; Rebezov, M.; Khayrullin, M.; Panasenko, S.; Tretyak, L.; Temerbayeva, M.; Kapustina, N.; et al. (2012). A Review on the Commonly Used Methods for Analysis of Physical Properties of Food Materials. Applied Sciences (Switzerland) 12
5. Cai, Z.; Wei, Y.; Shi, A.; Zhong, J.; Rao, P.; Wang, Q.; Zhang, H. (2023). Correlation between interfacial layer properties and physical stability of food emulsions: current trends, challenges, strategies, and further perspectives. Advances in Colloid and Interface Science, 313

Calculation of ECTS points

Activity form	Activity hours*
Lecture	30
Laboratory exercises	15
Preparation for the test	10
Preparing a report	5
Preparation for the exam	15
Student workload	**Hours** 75
Number of ECTS points	**ECTS** 3

* hour means 45 minutes

Effects

Code	Content
TN_K1_K01	The graduate is ready to contact and exchange of experiences and knowledge with the experts in order to explore better solutions for particular problems connected to among others: food production, delivery chain, food storage and human nutrition
TN_K1_U01	The graduate can conduct experiments and solve practical issues in the field of basic sciences, and then implement them in activities carried out under directional issues in the field of food processing and human nutrition
TN_K1_U03	The graduate can select methods and tools to make observations, measurements, and calculations in the field of phenomena occurring during processing, storage, research of food, human nutrition and consumer behaviour on the food market, and critically analyze and interpret the obtained data, assess the credibility of own actions
TN_K1_W03	The graduate knows and understands the composition and properties of raw materials, auxiliaries, food additives, and food industry products, the possibilities and conditions of use of them in food production, taking into account the principles of sustainable development and their impact on human health
TN_K1_W04	The graduate knows and understands the theoretical basis of phenomenon and changes occurring in raw materials, semi-finished products, and food products in a natural way, and under the influence of technological processes, food storage and testing