Course title:	New research trends in food engineering
Course title in Polish:	Współczesne trendy badawcze w inżynierii żywności
Course for discipline:	Food technology and nutrition

Semester:	6	**Status of course:**	faculty	**Language:**	english
Academic year:		**Catalog number:**			

Coordinator of course:	Dr hab. Katarzyna Samborska, prof. SGGW
Lecturer od course:	
Executing unit:	Institute of Food Sciences, Department of Food Engineering and Process Management
Ordering unit:	Doctoral School SGGW
Assumptions, goals and description of the course:	Expanding the knowledge and developing the doctoral student's research skills in the field of innovative technologies and prospective processes in the production of modern food, also including selected modern preliminary operations and methods of managing waste products. Class topics: 1. Possibilities of using osmotic dehydration for obtaining innovative food products. 2. New possibilities for producing powdered food using modern modified spray drying method, using innovative carriers that reduce the degradation of bioactive ingredients. 3. Non-thermal, innovative methods (pulsed electric field, pulsed light, ultrasound) as techniques modifying food properties and reducing energy consumption in food processing. 4. Freeze-drying and hybrid drying techniques as innovative methods of preservation, allowing to obtain a product with high nutritional value and functionality (including special foods, designer foods, functional foods, bioactive nutrients) and preserved microorganisms that retain non-standard technological features and high viability. 5. Innovative protective coatings and sustainable biodegradable food packaging, made using natural polymers.
Didactic form, number of hours:	laboratory, 10 h
Teaching methods:	Research workshops using modern research equipment, presentations using audiovisual techniques, experience/experiment, discussion, problem solving, case study, individual consultations.
Limit of people in the group:	16

Learning outcomes

KNOWLEDGE - the graduate knows and understands:	**SKILLS - the graduate is able to:**	**COMPETENCES - the graduate is ready to:**
To the extent enabling to revise the existing pradigms in the field/discipline - the world achievments, gathering theoretical background as well as general and selected detailed issues	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	Critically evaluate the achievments in the field/discipline represented
Major general development trends in the field/discipline		Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect
		Support the ethos of scientific circles and conduct independent research

The method of verification of learning outcomes:	Assessment of student activity during classes. Evaluation of reports on experiments performed, paying particular attention to the analysis and interpretation of the obtained results, their critical assessment and the ability to formulate conclusions.
Form of documentation of achieved learning outcomes:	Reports in writing, personal list with presentation evaluation
Elements and weights of the final grade:	Final assessment: presentation of measurement results 75%, activity and involvement during classes 25%
Place of the course:	Didactic room

Basic and supplementary literature

Basic literature:
Nowak, D., & Jakubczyk, E. (2020). The freeze-drying of foods—The characteristic of the process course and the effect of its parameters on the physical properties of food materials. Foods, 9(10), 1488.
Raso-Pueyo, J., & Heinz, V. (Eds.). (2010). Pulsed electric fields technology for the food industry: fundamentals and applications. Springer Science & Business Media
Akharume F.U., Singh K., Sivanandan L. 2016. Characteristics of apple juice and sugar infused fresh and frozen blueberries. LWT - Food Science and Technology, 73, 448-457.
Yadav A.K., Singh S.V. 2014. Osmotic dehydration of fruits and vegetables: A review. Journal of Food Science and Technology, 51(9), 1654-1673.
Samborska K. 2019. Powdered honey – drying methods and parameters, types of carriers and drying aids, physicochemical properties and storage stability. Trends in Food Science and Technology, 88, 133-142
Galus, S., Arik Kibar, E. A., Gniewosz, M., & Kraśniewska, K. (2020). Novel materials in the preparation of edible films and coatings—A review. Coatings, 10(7), 674. Haseley P.OetjenG.W.2018. Freeze drying, Wiley-VCH Vienheim
Additaional literature:
Baldwin E.A. Hagenmaier R., Bai J. Edible coatings and films to improve food quality. 2012, CRC Press, Boca Raton, FL, USA.
Samborska K, Wiktor A, Jedlińska A, Matwijczuk A, Jamróz W, Skwarczyńska-Maj K, Kiełczewski D, Tułodziecki M, Błażowski Ł, Witrowa-Rajchert D. 2019. Development and characterization of physical properties of honey-rich powder. Food and Bioproducts Processing, 115, 78-86
Other available scientific and industry journals

Comments:	

Estimated number of hours of work of the doctoral student necessary to achieve the assumed learning outcomes:	15

Leraning outcomes reference to the second degree characteristics of the National Qualification Framework (level 8) covering doctoral competences:		
Symbol:	**Learning outcomes:**	**8 level NQF**
SD1_KW01	To the extent enabling to revise the existing pradigms in the field/discipline - the world achievments, gathering theoretical background as well as general and selected detailed issues	P8S_WG
SD1_KW02	Major general development trends in the field/discipline	P8S_WG
SD1_KU05	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	P8S_UW
SD1_KK01	Critically evaluate the achievments in the field/discipline represented	P8S_KK
SD1_KK03	Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect	P8S_KK
SD1_KK08	Support the ethos of scientific circles and conduct independent research	P8S_KR