Course title:	New research trends in the analysis of physical properties, structure and stability of food
Course title in Polish:	Współczesne trendy badawcze w analizie właściwości fizycznych, struktury i stabilności żywności
Course for discipline:	food and nutrition technology

Semester:	8	**Status of course:**	faculty	**Language:**	english
Academic year:		**Catalog number:**			

Coordinator of course:	dr. Karolina Szulc
Lecturer od course:	Emloyees of the Department of Food Engineering and Process Management
Executing unit:	Institute of Food Sciences, WULS-SGGW
Ordering unit:	Doctoral School SGGW
Assumptions, goals and description of the course:	Assumptions and goal of the course: Expanding knowledge and developing research skills of the doctoral student in the field of new instrumental methods in the analysis of physical properties, structure and stability of food, in terms of theoretical foundations, procedures for determining and developing methods, research problems and possibilities of applications and use in work research and development. Course topics: Basic and advanced methods of determining food texture using a texturometer. Strength tests of materials on the Universal Testing Machine. Rotational and oscillatory rheometry in the study of viscous and viscoelastic properties of food using a rheometer. Concepts of food stability and phase changes based on the water level and methods of its measurement. Determination and description of water vapor adsorption and desorption isotherms and sorption kinetics by the dynamic DVS vapor sorption method using an automatic gravimetric analyzer. Investigation of the crystal structure and recrystallization of ice in frozen food using microscopic image analysis. Properties of food emulsion systems. Product quality assessment, detection and identification, and stability/instability analysis of emulsions with a wide range of concentrations and particle sizes using optical analyzer and a particle size analyzer by laser diffraction.
Didactic form, number of hours:	exercises, 10 h
Teaching methods:	Research workshops using new research equipment, presentations using audiovisual techniques, experience/experiment, disscussion, problem solving, case study, individual consultations.
Limit of people in the group:	8

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 activity during measurements and experiments performed during course. Presentation of measurement results, paying particular atention to the analysis and interpretation of the results obtained and the ability to formulate conclusions.
Form of documentation of achieved learning outcomes:	written reports, presentation
Elements and weights of the final grade:	Presentation of measurement results 75%, activity and involvement during classes 25%.
Place of the course:	Laboratories of the Department of Food Engineering and Process Management, Institute of Food Scienses, WULS-SGGW

Basic and supplementary literature

Basic literature:
Bhandari, B. R., & Roos, Y. H. (Eds.). (2016). Non-equilibrium states and glass transitions in foods: processing effects and product-specific implications. Woodhead Publishing.
McClements, D. J. (2015). Food emulsions: principles, practices, and technique CRC Press.
McKenna, B. M. (Ed.). (2003). Texture in Food: Semi-solid foods (vol. 1), Solid Food (vol. 2). Woodhead Publishing, Cambridge and CRC Press, Boca Raton
Lewicki P.P., Marzec A., Ranachowski Z. (2009). Acoustoic properties of foods. In: Food Properties Handbook (ed. M. Shafiur Rahman). CRC Press Taylor & Francis Group, Boca Raton, 811-841.
Supplementary literature:
Scientific research and review publications on the topics of the exercises.

Comments:	

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

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