



Food chemistry
Educational subject description sheet

Basic information

Field of study Food quality management and analysis		Education cycle 2025/26	
Speciality -		Subject code ND000000NZJS.I4.0725.25	
Organizational unit The Faculty of Biotechnology and Food Science		Lecture languages english	
Study level First-cycle (engineer) programme		Mandatory optional	
Study form Full-time		Block major subjects (conducted) in foreign languages	
Education profile General academic		Disciplines Food technology and nutrition	
		Subject related to scientific research Yes	
		Subject shaping practical skills Nie	
Teacher responsible for the subject	Witold Gładkowski		
Other teachers conducting classes	Witold Gładkowski		
Period Semester 3	Examination exam	Number of ECTS points 5.0	
	Activities and hours lecture: 14 laboratory classes: 30		

Goals

C1	knowledge about chemical, physical and sensory properties of main food constituents: carbohydrates, lipids, proteins, colorants, fragrances etc.
C2	knowledge about interactions and changes of food components during food storage and processing
C3	knowledge about structure and role of selected functional food additives

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	Student knows the chemical composition of food, can characterize the structure and properties of basic food components at the advanced level, describes and explains interactions between particular food components	NZ_P6S_WG02, NZ_P6S_WG03	written exam, written credit, presentation
W2	Student explains the influence of changes in food on the quality of food products at the advanced level, identifies the chemical hazards during food production and storage	NZ_P6S_WG02, NZ_P6S_WG03	written exam, written credit, presentation
W3	Student knows the physicochemical basis of techniques used to the isolation of some food components	NZ_P6S_WG01	written exam, written credit, presentation
Skills - Student can:			
U1	Student isolates selected food components using various laboratory methods and techniques and carries out simple experiments allowing to identify the food components	NZ_P6S_UW03	observation of student's work, active participation
U2	Student can interpret physicochemical processes and analyze hazards taking place during processing and food preservation	NZ_P6S_UW04	written exam
U3	Student can work individually and collectively, care for laboratory equipment and cleanliness in the laboratory, avoid of hazards in chemical laboratory, work safely for himself and other laboratory workers	NZ_P6S_UO09	observation of student's work
U4	Student is able to complete the knowledge about different isolation techniques	NZ_P6S_UU10	observation of student's work
Social competences - Student is ready to:			
K1	Student is ready to critical evaluation of his knowledge from food chemistry	NZ_P6S_KK01	observation of student's work, presentation
K2	Student is ready to use his knowledge to solving problems connected with isolation of food components	NZ_P6S_KK01	observation of student's work

Balance of ECTS points

Activity form	Activity hours*
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lecture	14	
laboratory classes	30	
exam / credit preparation	50	
consultations	14	
exam participation	2	
class preparation	15	
report preparation	10	
Student workload	Hours 135	ECTS 5.0
Workload involving teacher	Hours 46	ECTS 1.8
Practical workload	Hours 40	ECTS 1.5

* hour means 45 minutes

Study content

No.	Course content	Activities
1.	<p>Students performs 5 from the 9 excercises given below:</p> <ol style="list-style-type: none"> 1. The scope of food chemistry as the science. Chemical composition of food. 2. Water as the main food component. 3. The structure, properties and the properties of mono- and disaccharids. 4. Non-enzymatic browning of food - Maillard reaction and their application in formation of sensoric properties of food products. 5. Polissaccharides in food and their significance in food. 6. Structure, occurence and properties of fatty acids in food. 7. Structure and modifications of triacylglycerols and phospholipids. 8. Proteins in food products 9. The nonprotein nitrogenous compounds 10. Vitamins. 11. The occurrence, structure and properties of polyphenols. 12. Food colorants. 13. Flavor compounds in food. Formation of flavour during food processing. 14. Allergens, mutagens, cancerogens and anticancerogens, food contamination. 	lecture
2.	<ol style="list-style-type: none"> 1. Isolation of trimyristin from nutmeg 2. Isolation and identification of the volatile compounds of spices 3. Isolation of curcumin from curcuma 4. Properties of reducing sugars occurring in food 5. Isolation of piperine from black pepper 6. Isolation of phospholipids and cholesterol from egg yolk 7. Isolation of caffeine from tea leaves 8. Separation of pigments from plant material 9. Isolation of theobromine from cacao 	laboratory classes

Course advanced

Teaching methods:

lecture, classes

Activities	Examination methods	Percentage in subject assessment
lecture	written exam, presentation	50%
laboratory classes	written credit, observation of student's work, active participation	50%

Literature

Obligatory

1. Food Chemistry, H.-D.Belitz, W.Grosch, Springer-Verlag, 2009. 2. Food Chemistry, R. Fennema, Marcel Dekker, Inc. 1996.
2. Chemical and Functional Properties of Food Components, red. Z.Sikorski, Taylor and Francis Group, 2007.

Optional

1. Food Chemistry, R. Fennema, Marcel Dekker, Inc. 1996.
2. V. A. Parthasarathy, B. Chempakan, T.J. Zachariah „Chemistry of spices” □Oxford University Press, 2008.

Kierunkowe efekty uczenia się

Kod	Treść
NZ_P6S_KK01	The graduate is ready to use his knowledge for critical data analysis, seeking for this purpose the opinion of experts in solving various professional problems
NZ_P6S_UO09	The graduate is able to plan and organize their own and teamwork and interact a group
NZ_P6S_UU10	The graduate is able to plan the path of their own development and improve their professional competence throughout their lives
NZ_P6S_UW03	The graduate is able to select and use appropriate methods and techniques for the analysis of food, and use laboratory equipment and control and measuring apparatus
NZ_P6S_UW04	The graduate is able to design processes, analyse hazards, estimate risk level and identify critical control points in production processes and link them into pro-quality system activities
NZ_P6S_WG01	The graduate knows and understands to an advanced level issues related to chemistry, biochemistry, microbiology, mathematics and physics as aligned with the field of study Food quality management and analysis
NZ_P6S_WG02	The graduate knows and understands to an advanced level the properties of raw materials and food products of plant and animal origin and auxiliary materials, as well as food analysis methods/techniques and validation methods
NZ_P6S_WG03	The graduate knows and understands to an advanced level the chemical, biological and physical factors influencing the processing and storage of food products and their importance in shaping food quality and safety