

Załącznik nr 1**Course name:
Food Chemistry**

ECTS	5
Course status	<i>obligatory</i>
Course final assessment /evaluation of outcomes	<i>Exam</i>
Prerequisite	<i>no prerequisites</i>

**Main field of study:
... Food Technology**

Educational profile	General academic
Code of studies and education level	SI
Semester of studies	3 (winter)
Language of instruction	English

Course offered by:

Name of faculty offering the course	Faculty of Food Technology
Name of department offering the course	Department of Food Analysis and Evaluation of Food Quality
Course coordinator	dr hab. Jacek Rożnowski prof. URK

Learning outcomes:

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands			
FCH_W1	the basic and complementary food ingredients, their physicochemical and functional properties.	TŻ1_W01	RT
FCH_W2	the chemical reactions and physical changes of food ingredients undergoing under the influence of various chemical and physical factors and the influence of technological processes on the changes or losses of food ingredients and the quality of the food product.	TŻ1_W03	RT
FCH_W3	the methods of analytical detection of food ingredients in food products and methods of testing their physical and chemical properties (principles and analytical procedures).	TŻ1_W10	RT
SKILLS – student is able to			
FCH_U1	prepare the sample for testing in accordance with the rules of analysis, perform simple qualitative and quantitative determinations of food ingredients in accordance with the written instructions.	TŻ1_U04	RT
FCH_U2	properly use simple laboratory equipment and chemical reagents, complying with the principles of health and safety and good laboratory practice.	TŻ1_U06 TŻ1_U07	RT

FCH_U3	compile and interpret the results of the performed experiments, correctly formulate conclusions and prepare written reports on the work performed.	TŽ1_U03 TŽ1_U04	RT
SOCIAL COMPETENCIES – student is ready to:			
FCH_K1	continuous training and improvement of professional qualifications and personal development, as well as using the help of experts.	TŽ1_K01 TŽ1_K04	RT
FCH_K2	being responsible for his own work and that of others in terms of safety.	TŽ1_K02	RT
FCH_K3	cooperation in a team performing the various roles in it, to skilfully manage time and act in an entrepreneurial manner.	TŽ1_K02	RT

Teaching contents

Lectures	30 hours		
Topics	Introduction to the course purpose and scope of the subject, relationships of food chemistry with the other disciplines		
	Structure and chemical composition of food.		
	Water as a food component, water activity and its influence on changes in food.		
	Monosaccharides and oligosaccharides - classification, occurrence, functional properties, changes during food processing and storage.		
	Starch and non-starch polysaccharides - structure and properties, hydrocolloids: sources, functional properties.		
	Proteins - general characteristics, functional properties, changes during basic technological processes and storage.		
	Non-protein nitrogen compounds - structure, properties and occurrence.		
	Lipids: their transformation in food during processing and storage; saturated and unsaturated fatty acids - structure, properties and nomenclature; free radical reactions, antioxidants.		
	Vitamins - classification and general characteristics.		
	Minerals in food - occurrence, nutritional and technological role.		
	Flavoring substances (aromas and sweeteners) - structure, properties and occurrence.		
	Colorants - structure, classification, properties and durability.		
	Other natural food ingredients - health-promoting substances (phenolic compounds) and anti-nutritional substances.		
Food contamination, free radicals.			
Accomplished learning outcomes	<i>FCH_W1, FCH_W2, FCH_W3</i>		
Means of verification, rules and criteria of assessment	<i>Passing in written form (positive assessment for min. 51% points) Participation in the final evaluation of the module 50%</i>		
Practical classes:	30 hours		
Topics	- Safety rules of work in the laboratory: overview of the basic apparatus, equipment and laboratory glassware.		
	- detection of the selected food ingredients.		
	- assessment of the impact of technological processes on the content of food ingredients.		
	Basic properties of proteins		
Simple sugars, oligosaccharides:			
- optical properties,			
- reactivity.			
Natural and modified starch:			

	<ul style="list-style-type: none"> - reactivity, - physicochemical properties, changes under the influence of temperature.
	<p>Non-starch polysaccharides:</p> <ul style="list-style-type: none"> - reactivity, - physicochemical properties.
	<p>Fragrances:</p> <ul style="list-style-type: none"> - isolation of fragrances from the plant materials, - synthesis of fragrances.
	<p>Lipids:</p> <ul style="list-style-type: none"> - detection of selected lipid compounds in food, - reactivity.
	<p>Simple and complex lipids:</p> <ul style="list-style-type: none"> - chemical transformations, - properties of the reaction products
	<p>Natural and synthetic colorants:</p> <ul style="list-style-type: none"> - properties, - isolation and separation, - the influence of the reaction of the environment on their color and stability.
	<ul style="list-style-type: none"> - Natural and artificial antioxidant compounds in food. - Maillard reaction. - caramelization.
Accomplished learning outcomes	<i>FCH_U1; FCH_U2; FCH_U3; FCH_K1; FCH_K2; FCH_K3</i>
Means of verification, rules and criteria of assessment	<p>Passing laboratory classes on the basis of:</p> <ul style="list-style-type: none"> - correctly performed tasks in the laboratory, - laboratory work reports, - 2 partial tests in the field of classes (positive assessment for at least 51% of all points possible to receive). <p>Participation in the final evaluation of the module 50%</p>

References:

Basic	<ol style="list-style-type: none"> 1. <i>Fennema's food chemistry</i> (ed. by Srinivasan Damodaran, Kirk L. Parkin, Owen R. Fennema), CRC Press/Taylor & Francis, 2008 (URK library, library of the Department) 2. <i>Food: the chemistry of its components</i> (T. P. Coultate), The Royal Society of Chemistry, London, 1984 (URK library, library of the Department) 3. <i>Materials for laboratory classes prepared in English based on the script: Fortuna T., Rożnowski J. (red). Wybrane zagadnienia z chemii żywności. Wydawnictwo UR w Krakowie, 2012.</i>
Supplementary	<ol style="list-style-type: none"> 1. <i>Principles of Food Chemistry</i> (John M. de Man John W. Finley W. Jeffrey Hurst, Chang Yong Lee) Springer, Boston, 2018 https://link.springer.com/book/10.1007/978-3-319-63607-8 2. <i>Color atlas of biochemistry</i> (Jan Koolman, Klaus-Heinrich Roehm), Stuttgart ; New York: Thieme 2005 (URK library) 3. <i>IUPAC Nomenclature</i> https://iupac.org/what-we-do/books/color-books/

Structure of learning outcomes

Area of academic study: R – Agricultural, forestry and veterinary sciences	ECTS **
Area of academic study: T – technological	5,0 ECTS**

sciences	
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Structure of student activity			
Contact hours		64	hrs. 2,6 ECTS**
Including:	lectures	30	hrs.
	classes and seminars	30	hrs.
	consultations	2	hrs.
	participation in research	0	hrs.
	obligatory traineeships	0	hrs.
	participation in examination	2	hrs.
e-learning		0	hrs. 0,0 ECTS**
student own work		61	hrs. 2,4 ECTS**

*Areas of academic study in the fields of: H- humanities; S - social studies; P – biological sciences; T – technological sciences; M- medical, sport and health sciences; R – Agricultural, forestry and veterinary sciences; A – the arts

** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes