



Food chemistry
Educational subject description sheet

Basic information

| | | | |
|---|--|---|--|
| Field of study Food quality management and analysis | | Education cycle 2021/22 | |
| Speciality - | | Subject code WBiNoZNZJS.I4BO.0725.21 | |
| 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: 15 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_WG01, NZ_P6S_WG03 | written exam, written credit |
| 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_WG04, NZ_P6S_WG06 | written exam, written credit |
| W3 | Student knows the physicochemical basis of techniques used to the isolation of some food components | NZ_P6S_WG05 | written exam, written credit |
| Skills - Student can: | | | |
| U1 | Student isolates selected food components using various laboratory methods and techniques | NZ_P6S_UW06 | observation of student's work, active participation |
| U2 | Student carries out simple experiments allowing to identify the food components | NZ_P6S_UW01 | observation of student's work |
| U3 | Student can interpret physicochemical processes and analyze hazards taking place during processing and food preservation | NZ_P6S_UW05, NZ_P6S_UW07 | written exam |
| U4 | 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_UO13 | observation of student's work |
| U5 | Student is able to complete the knowledge about different isolation techniques | NZ_P6S_UU14 | 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 |
| K2 | Student is ready to use his knowledge to solving problems connected with isolation of food components | NZ_P6S_KK01, NZ_P6S_KO03 | observation of student's work |

Balance of ECTS points

| Activity form | Activity hours* |
|---------------|-----------------|
|---------------|-----------------|

| | | |
|-----------------------------------|---------------------|--------------------|
| lecture | 15 | |
| laboratory classes | 30 | |
| exam / credit preparation | 50 | |
| consultations | 14 | |
| exam participation | 2 | |
| class preparation | 15 | |
| report preparation | 10 | |
| Student workload | Hours 136 | ECTS 5.0 |
| Workload involving teacher | Hours 61 | ECTS 2.0 |
| Practical workload | Hours 40 | ECTS 1.5 |

* hour means 45 minutes

Study content

| No. | Course content | Activities |
|-----|---|--------------------|
| 1. | <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. Polysaccharides in food and their significance in food. 6. Structure, occurrence 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

| Activities | Examination methods | Percentage in subject assessment |
|--------------------|---|----------------------------------|
| lecture | written exam | 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, ed. 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 | Use of gained knowledge and to do critical data analysis in solving various problems in the quality management and food analysis, as well as, for consulting experts |
| NZ_P6S_KO03 | Demonstrate an active attitude in solving problems related to quality management and food safety |
| NZ_P6S_UO13 | Cooperate and work in a group, lead a team of people and be aware of responsibility for implemented joint actions |
| NZ_P6S_UU14 | Independently plan and develop own professional or scientific career, understands the need for lifelong learning |
| NZ_P6S_UW01 | Use possessed knowledge and collect data to analyze processes and phenomena in food economy, including economic and marketing analyzes of various enterprises |
| NZ_P6S_UW05 | Indicate appropriate methods, techniques and technologies used in food production and preservation |
| NZ_P6S_UW06 | Select and apply appropriate methods and analytical techniques using laboratory equipment and control-measuring devices |
| NZ_P6S_UW07 | Analyze hazards, estimate the level of risk and indicate critical control points in the selected production processes |
| NZ_P6S_WG01 | Advanced knowledge in chemistry, biochemistry, microbiology, mathematics and physics related to the quality management and food analysis |
| NZ_P6S_WG03 | Advanced properties of the plant and animal food raw materials and products, as well as, auxiliary materials |
| NZ_P6S_WG04 | Unit operations applied in food processing and preservation related to food quality |
| NZ_P6S_WG05 | Advanced methods / techniques of food analysis, conditions of their use and methods of validation |
| NZ_P6S_WG06 | At an advanced level the chemical, biological and physical risks during the production, processing and storage of food raw materials and products, assessing their impact on food quality and safety |