

ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ ЕКОНОМІЧНИЙ
УНІВЕРСИТЕТ ІМЕНІ СЕМЕНА КУЗНЕЦЯ

"ЗАТВЕРДЖУЮ"



Проректор

навчально-методичної роботи

Каріна ПЕЛІАШКАЛО

Екологічна безпека та якість харчової сировини і продукції

робоча програма навчальної дисципліни

| | |
|------------------|------------------------|
| Галузь знань | Усі |
| Спеціальність | Усі |
| Освітній рівень | перший (бакалаврський) |
| Освітня програма | Усі |

| | |
|---|------------|
| Статус дисципліни | Вибіркова |
| Мова викладання, навчання та оцінювання | Англійська |

Завідувач кафедри
технологій і безпеки життєдіяльності

Юрій БУЦ

Харків
2021

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SIMON KUZNETS KHARKIV NATIONAL UNIVERSITY OF ECONOMICS

Environmental safety and quality of food raw materials and products

Program of academic discipline

| | | |
|---|-------------------------|------------------|
| Field of knowledge | all | |
| Specialty | all | |
| Educational level | first (bachelor) | |
| Educational program | all | |
| Type of discipline | | selective |
| Language of teaching, training and evaluation | | english |

**Kharkiv
2021**

Approved at the department meeting of environmental technologies, ecology and safety of vital activity

Minutes № 3, October 20, 2021.

Creator:

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**Page of renewal and re-approval
of the academic discipline work program**

| Academic year | Date of department meeting of work program creator | Meeting number | The signature of the department head |
|---------------|--|----------------|--------------------------------------|
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Discipline annotation

The discipline belongs to the cycle of disciplines of professional training.

The quality and safety of food are the most important components on which the health of the population and the preservation of its gene pool depends. Due to the deteriorating environmental and climatic conditions in the world, non-compliance with the conditions of cultivation of raw materials and disruption of production processes, there is a risk of declining food quality and contamination with harmful substances of chemical and biological origin. Therefore, issues that cover the theoretical foundations of food safety, methods of quality control and safety, possible types of contamination and falsification - are relevant and are the purpose of this discipline.

The purpose of the discipline is to form in students a system of knowledge on their mastery of theoretical and practical foundations of quality control and food safety, acquaintance with international legal framework for food safety, the main tasks and priorities of state policy of Ukraine in food safety, mastering control methods quality of raw materials and food products and technological process of food production. Study of theoretical foundations and practical skills of basic requirements for safety and quality of raw materials and food products; mastering the classification of hazardous factors and food safety criteria; understanding the prospects of using modern methods of analysis to identify hazardous substances in food.

Characteristics of the discipline

| | |
|------------------------|---------------|
| Level | 3 |
| Semester | 5 |
| Number of ECTS credits | 5 |
| Form of final control | credit |

Structural-logical scheme of studying the discipline:

| Prerequisites | Postrequisites |
|--|-----------------------------------|
| Sanitation and hygiene in the industry | Standardization and certification |
| | |
| | |

Competent and results of study discipline:

| Competence | Results of studying |
|---|--|
| Develop recommendations for public authorities and local governments in the field of control over hospitality activities. | make informed decisions and be responsible for the results of their professional activities; understand the main provisions of the legislation in the field of tourist and recreational services, national and international standards for hotel and restaurant services; |
| Create quality, competitive and safe hospitality services for the needs of the national market and foreign consumers. | organize compliance with the standards of service, industrial sanitation and hygiene in the workplace, fire safety rules, operation of technological equipment and inventory, instruct employees in the workplace, to provide the basic operations on accommodation and food of the population, to build cycles of technologies of hotel and restaurant service on various types of the profile enterprises, to calculate requirements for |

| | |
|--|---|
| | resources and the equipment, to prepare the corresponding documentation; identify and explain the principles and methods of organization and technology of public service in compliance with quality standards and safety standards. |
|--|---|

The discipline program

1. Theoretical and methodological principles of food security

- 1.1. Contaminants in food and ways of their migration.
- 1.2. Regulatory bases of food safety.
International food law. Codex Alimentarius.
Food Safety Guarantee System - HACCP.
Standards of a series 180 22000.
European Union food safety legislation.
The main legislative documents on food security in Ukraine.
- 1.3. Standardization of contaminants in food.
Methodology of hygienic rationing of xenobiotics in food products.
Food safety criteria.

2. Metal pollution

- 2.1. General characteristics of toxic metals.
- 2.2. Toxic and hygienic characteristics of metal contaminants.
- 2.3. Measures to reduce the content of heavy metal cations in food.

3. Radionuclides

- 3.1. Radioactivity and ionizing radiation.
Ionizing radiation.
Radiation units.
- 3.2. Sources and routes of radionuclides in the body.
- 3.3. Biological effect of ionizing radiation on the human body.
- 3.4. The most common radionuclides of Chernobyl origin.
- 3.5. Basic principles of radioprotective nutrition.

4. Nitrates, nitrites and nitroso compounds

- 4.1. The main sources of nitrates and nitrites in food.
- 4.2. Biological action of nitrates and nitrites on the human body.
- 4.3. Nitroso compounds, their toxicological characteristics.
- 4.4. Technological means of reducing the content of nitrates in food raw materials.

5. Pesticides

- 5.1. General characteristics of pesticides.
- 5.2. Sources of pesticides in food.
- 5.3. The impact of pesticides on the human body and the environment.
- 5.4. Toxic and hygienic characteristics of pesticides.
- 5.5. Technological ways to reduce pesticide residues in food products.

6. Dioxins, polycyclic aromatic and chlorine-containing hydrocarbons

- 6.1. Dioxins and dioxin-like compounds.
Sources of dioxins.
Toxicological characteristics of dioxins and dioxin-like compounds.
The content of dioxins in food.

Prevention of dioxin contamination.
Polycyclic aromatic hydrocarbons.
Chlorine-containing hydrocarbons.

7. Mycotoxins

- 7.1. General characteristics of mycotoxins.
- 7.2. Sources of mycotoxins in food.
- 7.3. Toxicological characteristics of mycotoxins.
- 7.4. The effect of mycotoxins on the human body.
- 7.5. Means to reduce the content of mycotoxins in food.

8. Antibiotics and hormonal drugs

- 8.1. Antibiotics in food.
Sources of antibiotics in food.
Sulfanilamides and nitrofurans.
Effects of antibiotics on human health and the environment.
Prevention of antibiotic contamination.
- 8.2. Hormonal drugs.
Sources of hormonal drugs in the food product.
Effects of hormonal drugs on human health.

9. Hazards of microbiological and viral origin

- 9.1. Microbiological risk factors and measures to combat the spread of foodborne infections and poisonings.
- 9.2. Sanitary-indicative microorganisms.
- 9.3. Conditionally pathogenic microorganisms.
Microorganisms that cause bacterial toxicoinfections.
Microorganisms that cause bacterial intoxication.
- 9.4. Pathogenic microorganisms.
Microorganisms that cause intestinal infections.
Microorganisms that cause zoonoses.
- 9.5. Microorganisms spoilage food.

10. Toxins of natural origin in food

- 10.1. Chemical components of plant products.
Plant toxins.
Mushroom toxins.
Digestive enzyme inhibitors.
Antivitamins.
Oxalates and phytin.
Glycoalkaloids.
Cyanogenic glycosides.
Digestible substances.
Lectins.
- 10.2. Poisoning by chemical components of mariculture.

11. Genetically modified food sources

- 11.1. The main tasks of genetic engineering in the field of food production.
- 11.2. Transgenic organisms and products.
- 11.3. Biosafety of genetically modified organisms.
- 11.4. Regulatory regulation of production and use of genetically modified organisms.
- 11.5. Food toxic and hygienic evaluation of products from genetically modified sources.

12. Nutritional supplements

- 12.1. General characteristics of food additives.
- 12.2. Classification and designation of food additives.
- 12.3. Improvers of organoleptic properties.
Food consistency improvers.
Food dyes.
Flavors.
Flavoring substances.
- 12.4. Preservatives.
Antiseptics.
Antibiotics.
Antioxidants and their synergists.
- 12.5. Regulatory regulation of the use of food additives.
- 12.6. Biosafety of food additives.

13. Technological additives

- 13.1. General characteristics of technological additives.
- 13.2. Process accelerators.
- 13.3. Myoglobin fixatives.
- 13.4. Bread quality improvers.
- 13.5. Substances for bleaching flour.
- 13.6. Polishing agents.
- 13.7. Brighteners and complexing substances.
- 13.8. Solvents.
- 13.9. Detergents, detergents and disinfectants.

14. Biologically active additives

- 14.1. Biologically active additives in human nutrition.
- 14.2. Nutraceuticals.
- 14.3. Parapharmaceuticals.
- 14.4. Eubiotics.
- 14.5. Advantages and disadvantages of dietary supplements.
- 14.6. Legislative regulation of the use of biologically active additives.

15. Food safety related to packaging components

- 15.1. Modern development of consumer packaging.
Trends in consumer packaging.
Modern packaging materials.
- 15.2. Hygienic aspects of the use of polymers for food packaging.
- 15.3. Packaging and the state of the environment.

16. Social toxicants

- 16.1. Caffeinated beverages.
- 16.2. Tobacco smoke and smoking.
- 16.3. Alcohol.
- 16.4. Drugs.

The list of topics of practical classes, the list of questions and tasks for independent work of students is given in the table "Rating-plan of discipline".

Teaching and learning methods

Distribution of teaching and learning methods on the topics of the discipline

| Topic | Practical application of educational technologies |
|--|---|
| 1. Theoretical and methodological principles of food security | Discussions, presentations, illustrations |
| 2. Metal pollution | Work in small groups on the issue: "Metal pollution" |
| 3. Radionuclides | Work in small groups on the issue: "Radionuclides". Presentations, illustrations |
| 4. Nitrates, nitrites and nitroso compounds | Discussions, presentations, illustrations |
| 5. Pesticides | Work in small groups on the topic: "Pesticides". Presentations, illustrations |
| 6. Dioxins, polycyclic aromatic and chlorine-containing hydrocarbons | Discussions, presentations, illustrations |
| 7. Mycotoxins | Work in small groups on the issue: "Sanitary and hygienic assessment and conditions for ensuring the quality of food and ready meals." Presentations, illustrations |
| 8. Antibiotics and hormonal drugs | Discussions, presentations, illustrations |
| 9. Hazards of microbiological and viral origin | Discussions, presentations, illustrations |
| 10. Toxins of natural origin in food | Work in small groups on the topic: "Toxins of natural origin in food". Presentations, illustrations |
| 11. Genetically modified food sources | Discussions, presentations, illustrations |
| 12. Nutritional supplements | Work in small groups on the topic: "Nutritional supplements". Presentations, illustrations |
| 13. Technological additives | Work in small groups on the topic: "Technological additives". Presentations, illustrations |
| 14. Biologically active additives | Discussions, presentations, illustrations |
| 15. Food safety related to packaging components | Work in small groups on the topic: "Food safety related to packaging components". Presentations, illustrations |
| 16. Social toxicants | Discussions, presentations, illustrations |

The order of evaluation of learning results

The system of assessment of the developed competencies of students takes into account the types of occupations, which according to the curriculum program include lectures, practical classes, and independent work. Assessment of the developed competencies in students is carried out using a 100-point accumulation system.

The system of assessment of the formed competencies of students takes into account the types of classes, which according to the curriculum of the discipline include practical classes, as well as independent work. Control measures include: current control, which is carried out during the semester during practical classes and is assessed by the amount of points scored; modular control, which is carried out taking into account the current control over the relevant content module and aims at integrated assessment of student learning outcomes after studying the material from the logically complete part of the discipline - the content module.

During the semester the student can receive for work:

in practical classes maximum - 52 points.

in control tests maximum - 48 points.

Completion of individual tasks gives the student the opportunity to receive a maximum of 4 points for work. When performing an individual task, the student must take into account the factor of timeliness, the work must not only be performed qualitatively and in full, but also to pass it for testing within the time limit set by the teacher. If a student delays the assignment without good reason (such as illness), the grade will be reduced.

Compilation of control tests of independent study of educational material on each topic gives the student the opportunity to receive a maximum of 48 points. To complete the course, a student must receive a total of at least 60 points in all types of work during the semester.

The final grade in the discipline is calculated taking into account the points obtained for practical tasks, seminars and test control of independent work on the accumulative system. The total result in points for the semester is: "60 or more points - credited", "59 or less points - not credited" and is entered in the test "Statement of performance" of the discipline.

The final grade is set according to the scale given in the table "Grade scale: national and ECTS".

The evaluation scale: national and ECTS

| The amount of points for all types of learning activities | ECTS mark | National mark | |
|---|-----------|---|------------|
| | | for exam, course project (work), practice | for credit |
| 90 – 100 | A | excellent | accepted |
| 82 – 89 | B | good | |
| 74 – 81 | C | | |
| 64 – 73 | D | satisfactory | |
| 60 – 63 | E | | |
| 35 – 59 | FX | unsatisfactory | unaccepted |
| 1 – 34 | F | | |

Rating plan of the discipline

| Topics | Forms and types of education | Forms of evaluation | Max score |
|----------|------------------------------|--|---|
| Topic 1. | <i>Classroom work</i> | | |
| | Lecture | Theoretical and methodological principles of food security | Work on lectures |
| | Practice session | Development of measures to ensure the safety of food technology, taking into account the principles of HACCP | Active participation in practical tasks |
| | <i>Individual work</i> | | |

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|-----------------|------------------------------------|---|---|----|
| | Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 |
| Topic 2. | <i>Classroom work</i> | | | |
| | Lecture | Metal pollution | Work on lectures | |
| | Practice session | Comprehensive product quality assessment. Application of the principles of qualimetry to assess product quality | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| | Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 |
| Topic 3 | <i>Classroom work</i> | | | |
| | Lecture | Radionuclides | Work on lectures | |
| | Practice session | Product quality formation and product safety analysis | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| | Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 |
| Topic 4 | <i>Classroom work</i> | | | |
| | Lecture | Nitrates, nitrites and nitroso compounds | Work on lectures | |
| | Practice session | Use of differential and complex methods of expert assessments of the quality of bakery products | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| | Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 |
| Topic 5 | <i>Classroom work</i> | | | |
| | Lecture | Pesticides | Work on lectures | |
| | Practice session | Product quality assessment. | Test work №1 | 10 |
| | <i>Individual work</i> | | | |
| | Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | | |
| Topic 6 | <i>Classroom work</i> | | | |
| | Lecture | Dioxins, polycyclic aromatic and chlorine-containing hydrocarbons | Work on lectures | |
| | Practice session | Development of draft technical conditions for food products. | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| | Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 |

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|------------------------------------|--|---|---|----|
| Topic 7 | <i>Classroom work</i> | | | |
| | Lecture | Mycotoxins | Work on lectures | |
| | Practice session | Calculation of permissible content of toxic substances - heavy metals in new types of food products | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 | |
| Topic 8 | <i>Classroom work</i> | | | |
| | Lecture | Antibiotics and hormonal drugs | Work on lectures | |
| | Practice session | Criteria for hygienic evaluation of food raw materials and food products for mycotoxins | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 | |
| Topic 9 | <i>Classroom work</i> | | | |
| | Lecture | Hazards of microbiological and viral origin | Work on lectures | |
| | Practice session | Hygienic assessment of the main groups of food products of marketable origin | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 | |
| Topic 10 | <i>Classroom work</i> | | | |
| | Lecture | Toxins of natural origin in food products | Work on lectures | |
| | Practice session | Assessment of toxins | Test work №2 | 10 |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | | | |
| Topic 11. | <i>Classroom work</i> | | | |
| | Lecture | Genetically modified food sources | Work on lectures | |
| | Practice session | Structure and functions of the digestive system | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 | |

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|------------------------------------|--|---|---|----|
| Topic 12. | <i>Classroom work</i> | | | |
| | Lecture | Nutritional supplements | Work on lectures | |
| | Practice session | Compiling a healthy diet depending on daily energy expenditure | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 | |
| Topic 13. | <i>Classroom work</i> | | | |
| | Lecture | Technological additives | Work on lectures | |
| | Practice session | Determining the individual needs of the body in macro- and micronutrients and vitamins | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 | |
| Topic 14. | <i>Classroom work</i> | | | |
| | Lecture | Biologically active additives | Work on lectures | |
| | Practice session | Determining the authenticity of the product by the bar code of the international European standard EAN. | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 | |
| Topic 15. | <i>Classroom work</i> | | | |
| | Lecture | Food safety associated with packaging components | Work on lectures | |
| | Practice session | Determining the shelf life of food products | Active participation in practical tasks | |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | 5 | |
| Topic 16. | <i>Classroom work</i> | | | |
| | Lecture | Social toxicants | Work on lectures | |
| | Practice session | Food safety | Test work №3 | 15 |
| | <i>Individual work</i> | | | |
| Questions and tasks for self-study | Preparation for classes Search, selection and review of literary sources on a given topic | Homework check | | |

Recommended Books

Basic

1. Безпека продовольчої сировини і продуктів харчування [Електронний ресурс] : науково-допоміжний бібліографічний покажчик / [упоряд. О. В. Олабоді] ; Нац. ун-т харч. технологій. Наук.-техн. б-ка; – Київ, 2018. – 96 с.
2. Екологічна безпека продуктів харчування : практикум / Олексій Миколайович Крайнюков, Іветта Анатоліївна Кривицька . – Харків : Видавництво ХНУ ім. В.Н. Каразіна, 2020 . – 96 с.
3. Бочарова, О. В. НАССР і системи управління безпечністю харчової продукції : підручник / Бочарова Оксана Володимирівна ; Одес. нац. акад. харч. технологій. - Одеса : Атлант, 2019. - 376 с.
4. Безпека та ризики добавок в продуктах харчування, косметичі та засобах особистої гігієни : довідник / В. М. Войціцький та ін. – вид. 2-ге, перероб і допов. – Київ : Компринт, 2018. – 295 с. – Режим доступу: <http://irbis-nbuv.gov.ua>
5. Закон України «Про основні принципи та вимоги до безпечності та якості харчових продуктів» / Офіційний вісник України від 05.02.1998 — 1998 р., № 3, стор. 13, стаття 75, код акта 4679/1998, Режим доступу : <https://zakon.rada.gov.ua/laws/show/771/97-%D0%B2%D1%80#Text>
6. Киш Л. М. Продовольча безпека України: актуальні питання якості та доступності продуктів харчування / Л. М. Киш // Причорноморські економічні студії. – 2018. – Вип. 27(1). – С. 59-63. – Режим доступу : [http://nbuv.gov.ua/UJRN/bses_2018_27\(1\)_14](http://nbuv.gov.ua/UJRN/bses_2018_27(1)_14).

Additional

7. Біологічні та фізико-хімічні основи харчових технологій : монографія / В. А. Домарецький, А. М. Куц, О. Ю. Шевченко та ін. ; під ред. В. А. Домарецького ; Національний університет харчових технологій. – Київ : Фенікс, 2011. – 704 с.
8. Кундеева, Г. О. Формування продовольчої безпеки в умовах еко-соціо-економічної моделі суспільного розвитку: комплексний підхід : монографія / Г. О. Кундеева ; Національний університет харчових технологій. – Ніжин : ПП Лисенко М. М., 2015. – 240 с.
9. Загальні технології харчових виробництв : підручник / В. А. Домарецький, П. Л. Шиян, М. М. Калакура, Л. Ф. Романенко ; Національний університет харчових технологій. – Київ : Університет Україна, 2010. – 814 с.
10. Нутриціологія : навч. посібник / Н. В. Дуденко, Л. Ф. Павлоцька, І. В. Цихановська та ін. – Харків : Світ книг, 2013. – 560 с.
11. Товарознавчі аспекти підвищення безпеки харчових продуктів : монографія / А. А. Дубініна, Л. П. Малюк, Г. А. Селютина, Т. М. Шапорова. – Київ : Професіонал, 2005. – 176 с.
12. ДСТУ 2296-93. Національний знак відповідності. Форма, розміри, технічні вимоги та правила застосування.
13. ДСТУ ISO 9001:2008. Системи управління якістю. Вимоги.

Information resources and the Internet

14. Environmental safety and quality of food raw materials and products: For all students of the first (bachelor's) level [Electron. resource]. - Access mode : <https://pns.hneu.edu.ua/course/view.php?id=8340> “
15. <https://dpss.gov.ua/> - State Service of Ukraine for Food Safety and Consumer Protection.
15. <https://www.me.gov.ua/> - Ministry of Economy of Ukraine.
16. http://www.iso.org/iso_catalogue.htm - Catalog of ISO Standards [Electronic resource]