**NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE**

Department of Plant Science

**"CONFIRMED"**
Dean of the Faculty
of Agricultural Management
_____Anatoliy OSTAPCHUK
"___"_____2023 y.

**"APPROVED"**
at the meeting of the department of Plant Science
Protocol № 20 dated "21"_04_2023 y.
Head of Department
_____Svitlana KALENSKA

**"REVIEWED"**
Program Coordinator "Marketing"

Program Coordinator
_____ Violeta HERAIMOVYCH

**PROGRAM OF THE COURSE**

# SYSTEMS OF TECHNOLOGIES: CROP PRODUCTION

Specialization **075 "Marketing"**
Educational program **Marketing**
Faculty of **Agricultural Management**

Developers: **Bohdan Mazurenko**, PhD in Agronomy
**Liubov Honchar**, PhD in Agronomy

Kyiv – 2023 y.

## 1. **Description of the course**

# Systems Of Technologies: Crop Production

| **Field of knowledge, specialization, educational program, educational degree** | | |
|---|---|---|
| Educational degree | *Bachelor's* | |
| Specialization | *075 "Marketing"* | |
| Educational program | *Marketing* | |
| **Characteristics of the course** | | |
| Type | Compulsory | |
| Total number of hours | 72 (120) | |
| Number of ECTS credits | 2.4 (4) | |
| Number of content modules | 2 | |
| Course project (work) (if applicable) | – | |
| Form of assessment | *Exam* | |
| **Indicators of the course for full-time and part-time forms of study** | | |
| | Full-time form of study | Part-time form of study |
| Course (year of study) | 1 | 1 |
| Semester | 1 | 1 |
| Lecture classes | *18 hr.* | *4 hr.* |
| Practical, seminar classes | *- hr.* | *2 hr.* |
| Laboratory classes | *18 hr.* | *- hr.* |
| Self-study | *36 hr.* | *- hr.* |
| Individual assignments | *hr.* | *66 hr.* |
| Number of weekly classroom hours for the full-time form of study | *4 hr.* | |

## 2. **Purpose, objectives, and competencies of the course**

The main **purpose** of the discipline is to provide knowledge and skills for the rational selection and effective application of various technological elements aimed at increasing crop productivity, reducing production costs, and enhancing the competitiveness of the obtained agricultural products. The key tasks include acquiring practical skills in producing high-quality, environmentally friendly products with minimal energy and labor costs while maximizing the output per unit of time and unit of area. This requires wide implementation of variety-based, intensive, energy- and resource-efficient, and environmentally sustainable technologies. It also involves the ability to align the cultivation of agricultural crops with market demands. The discipline covers theoretical foundations of occupational safety, legal aspects of occupational safety for workers in plant production, safety techniques in plant production, and fire safety in plant production.

***Acquisition of competencies:***

**Integrated competency (IC):_** The ability to solve complex specialized tasks and practical problems in the field of marketing or during the learning process, which involves the application of relevant theories and methods, and is characterized by complexity and uncertainty of conditions..

**General competencies (GC):_**

GC4. The ability to learn and acquire contemporary knowledge.

GC5. Determination and perseverance in achieving set goals and fulfilling responsibilities.

GC11. The ability to work in a team.

GC13. The ability to work in an international context.

**Professional (special) competencies (PC**):_

PC 7. The ability to substantiate, present, and implement research findings in the field of marketing.

**Program learning outcomes (PLO)**:

PLO 5. The ability to identify and analyze key characteristics of marketing systems at different levels, as well as the behaviors of their subjects.

PLO 9. The ability to evaluate risks in conducting marketing activities, determine the level of uncertainty in the marketing environment when making management decisions.

PLO 11. Demonstrating the ability to apply an interdisciplinary approach and perform marketing functions of a market entity.

PLO 13. Being accountable for the results of one's activities and demonstrating entrepreneurial and managerial initiative.

PLO 26. Preparing founding documents and registering a business, taking into account the specifics of different organizational and legal forms of economic activity in accordance with current legislation..

## 3. Program and structure of the course for:

– complete full-time (part-time) form of study;

– shortened full-time (part-time) form of study.

| Names of content modules and topics | Number of hours | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Full-time form | | | | | | | Part-time form | | | | | |
| | weeks | total | including | | | | | total | including | | | | |
| | | | l | p | lab | ind | self | | l | p | lab | ind | self |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| **Content Module 1. Features and prospects of using marketing tools in crop production.** | | | | | | | | | | | | | |
| Topic 1: Plant science as a discipline and branch of agriculture. The state of modern crop production in Ukraine and the world. | 1 | 6 | 2 | - | 2 | - | 2 | 5 | 1 | - | - | 4 | - |
| Topic 2. Cereals is a basis of crop | 2 | 8 | 2 | - | 2 | - | 4 | 7 | 1 | - | - | 6 | - |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| production | | | | | | | | | | | | | |
| Topic 3. Organizational principles of effective winter wheat cultivation. | 3 | 8 | 2 | - | 2 | - | 4 | 10 | 2 | - | - | 8 | - |
| Topic 4. Early and late spring cereals – organizational principles of effective cultivation | 4 | 8 | 2 | - | 2 | - | 4 | 8 | - | - | - | 8 | - |
| Topic 5. Legumes. Management in cultivation technologies of peas and soybean | 5 | 8 | 2 | - | 2 | - | 4 | 8 | - | - | - | 8 | - |
| Total for content module 1 | 38 | | 10 | - | 10 | - | 18 | 38 | 4 | - | - | 34 | - |
| Content Module 2. Organization of cultivation of industrial crops (raw materials) for processing industry. | | | | | | | | | | | | | |
| Topic 6. Tuber crops. general characteristics features at management of production | 6 | 8 | 2 | - | 2 | - | 4 | 6 | - | - | - | 6 | - |
| Topic 7. Root crops. Sugar beets is a main raw material for sugar production | 7 | 8 | 2 | - | 2 | - | 4 | 8 | - | 2 | - | 6 | - |
| Topic 8. The place of oil crops in Ukraine and the world. Choosing a crop and management in its cultivation | 8 | 8 | 2 | - | 2 | - | 4 | 10 | - | - | - | 10 | - |
| Topic 9. Sunflower and rapeseed - the main oil crops of Ukraine and the world | 9 | 10 | 2 | - | 2 | - | 6 | 10 | - | - | - | 10 | - |
| Total for content module 2 | 34 | | 8 | - | 8 | - | 18 | 34 | - | 2 | - | 32 | - |
| Total hours | 72 | | 18 | - | 18 | - | 36 | 72 | 4 | 2 | - | 66 | - |

## 4. Seminar topics

| № | Topic title | Number of hours |
|---|---|---|

## 5. Practical class topics

| № | Topic title | Number of hours |
|---|---|---|

## 6. Laboratory class topics

| № | Topic title | Number of hours |
|---|---|---|
| 1 | "General characteristics of cereal crops. | 2 |
| 2 | Characteristics of crops and their growth phases | 2 |
| 3 | Botanical and morphological characteristics of wheat. | 2 |
| 4 | Morphological structure of corn. | 2 |
| 5 | Legume crops. Features of growth and development. | 2 |
| 6 | Potatoes. Botanical characteristics. | 2 |
| 7 | General characteristics of root vegetables. | 2 |
| 8 | Characteristics of representatives of the oil crop group. | 2 |
| 9 | Sunflower. Morphological structure. | 2 |
| Total | | 18 |

## 7. Independent work topics

| № | Topic title | Number of hours |
|---|---|---|
| 1 | Spring barley: significance, biological features, cultivation technology. | 6 |
| 2 | Buckwheat: significance, biological features, cultivation technology. | 6 |
| 3 | Lentils: significance, biological features, cultivation technology. | 4 |
| 4 | Chickpeas: significance, biological features, cultivation technology. | 4 |
| 5 | Oil crops of the Brassicaceae family. | 6 |
| 6 | Essential oil crops. | 5 |
| 7 | Fiber crops. | 5 |
| | Total | 36 |

## 8. Samples of control questions, tests for assessing the level of knowledge acquisition by students.

Form № N-5.05
F-7.5-2.1.6-24

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| | | | |
|---|---|---|---|
| QL «Bachelor» Educational program «**Marketing**» | **Department of Plant Science** 2023-2024 educational | **EXAM TICKET #15** Discipline: **System of technologies: crop production** | **Approved** Head of department _____ (sign) |

| | | | |
|---|---|---|---|
| | year | | Kalenska S.M.<br>_____ 2023 |

**Exam questions (essay – 100-200 words) –** Екзаменаційні запитання

1. **Types of sowing the agriculture crops** (*Способи сівби с.-г. культур)*
2. **Biological peculiarities of sunflower** (*Біологічні особливості соняшнику*)

**Tests**

| **1.** | **Mais(corn) forms two types of inflorescences. There are …**<br>(Назвіть 2 види суцвіть у кукурудзи) |
|---|---|
| A | **Ear/spike** (колос) |
| B | **Corncob** (початок) |
| C | **Panicle** (волоть) |
| D | **Flowerhead** (кошик)_ |

| **2.** | **Fruit of family Fabaceae (Legumes) is.** (Плід бобових це…) |
|---|---|
| A | **Caryopsis** (зернівка) |
| B | **Pod/pulse** (біб) |
| C | **Silicle** (стручок) |

| **3.** | **Root vegetables(taproots, example sugar beet) is … crops**<br>(Коренеплоди за циклом розвитку це…) |
|---|---|
| A | **Annial** (однорічні) |
| B | **Biennial** (дворічні) |
| C | **Perennial** (багаторічні) |

| **4.** | **High oil content (more 30 %) forms in seed of:**<br>(Високий вміст олії в зерні у …) |
|---|---|
| A | **Wheat** (пшениця) |
| B | **Mais** (кукурудза) |
| C | **Soja** (соя) |

5. **Cereals have a low oil contents in seeds. (*True or false*)**

| **6.** | **Essential oils in fennel and anise are containing in**<br>(ефірна олія в анісу та фенхелю міститься в ) |
|---|---|
| A | **Stem/sprout** (пагін/стебло) |
| B | **Seed** (насіння) |
| C | **Inflorescence** (суцвіття) |
| D | **Root** (корінь) |

| **7.** | **Fruit of Cereals (fam. *Graminea*) is.** (Плід злакових це…) |
|---|---|
| A | **Caryopsis** (зернівка) |

| | |
|---|---|
| B | **Pod/pulse** (біб) |
| C | **Silicle** (стручок) |

| **8.** | **Stem of cereals is** (Коренеплоди за циклом розвитку це…) |
|---|---|
| A | **Strow** (соломина) |
| B | **Vine** (лоза/ліана) |
| C | **Tuber** (бульба) |

| **9.** | **High oil content (more 30 %) forms in seed of:**<br>(Високий вміст олії в зерні у …) |
|---|---|
| A | **Wheat** (пшениця) |
| B | **Mais** (кукурудза) |
| C | **Sunflower** (соняшник) |

10. **Flax (*Linum*) cultivating for fiber and seeds. (*True or false*)**

## 9. Teaching methods.

Methods of organization and implementation of teaching and learning of students who used to study subjects:

1. in terms of transmission and perception of educational information :
   - verbal (lecture);
   - visual (illustration , demonstration);
   - practical ( laboratory work);
2. in terms of logic and thinking:
   - explanatory, illustrative (presentation);
   - reproductive (short test papers);
3. in terms of management training:
   - job training under the supervision of a teacher;
   - independent work;
4. in terms of a team:
   - incentives ( extra points for abstracts);
5. aspect of self-employment:
   - Training Module : structural logic scheme;
   - sample tests

## 10. Forms of assessment

Forms of control students used to the discipline: Current, landmark and final control.

***Current control*** knowledge is an integral part of the whole educational process and serves as a means of identifying the degree of perception (learning) training material. Learning management is possible only on the basis of the current control. The tasks are reduced to the current control order:

- identify the scope, depth and quality perception (mastering) of the material being studied;
- identify deficiencies in knowledge and identify ways to address them;
- identify the degree of responsibility of students and their attitudes to work, finding the causes that hinder their work;
- identify the level of mastering the skills of independent work and identify ways and means of development;
- stimulate students' interest in the subject and in the knowledge of their activity.

The main task of this control - to help students organize their work, learn independently, responsibly and systematically study all subjects.

***Block (thematic, modular) control*** of knowledge is an indicator of quality study of selected chapters and topics related cognitive, methodological, psychological and organizational qualities of students.

***Final control*** is carried out with students to assess their knowledge and skills in the discipline. The main goal - establishing actual content in terms of student learning, the quality and depth of skills and apply them in practice. Final control. In the discipline we apply a differentiated final control of exhibiting total points for the educational process and final control.

11. **Distribution of grades received by students.** Evaluation of student knowledge is carried out on a 100-point scale and is converted to national grades according to Table 1 "Regulations and Examinations and Credits at NULES of Ukraine" (order of implementation dated 26.04.2023, protocol №10)

| **Student rating, points** | **National grade based on exam results** | |
|---|---|---|
| | **Exams** | **Credits** |
| **90-100** | **Excellent** | **Passed** |
| **74-89** | **Good** | |
| **60-73** | **Satisfactory** | |
| **0-59** | **Unsatisfactory** | **Not passed** |

In order to determine the rating of a student (listener) in the discipline $\mathbf{R_{dis}}$ (up to 100 points), the rating from the exam $\mathbf{R_{ex}}$(up to 30 points) is added to the rating of a student's academic work $\mathbf{R_{aw}}$ (up to 70 points): $\mathbf{R_{dis} = R_{aw} + R_{ex}}$ **.**

**12. Educational and methodological support.**

1. Program Of The Course SYSTEMS OF TECHNOLOGIES: CROP PRODUCTION
2. Course of lectures of the discipline “SYSTEM OF TECHNOLOGY: CROP PRODUCTION” for students of specialty 073 "Management", education degree «Bachelor». 2021.
3. SYSTEM OF TECHNOLOGY:CROP PRODUCTION. Methodical recommendations for practical works and individual study of the discipline for students of specialty 073 Management, education degree «Bachelor»
4. eLearn – https://elearn.nubip.edu.ua/course/view.php?id=459

**13. Recommended sources of information**


1. *CROP PRODUCTION GUIDE AGRICULTURE. Tamil Nadu Agricultural University. Link: https://www.freebookcentre.net/biology-books-download/gotoweb.php?id=13855*
2. Graham Thiele, Michael Friedmann, Hugo Campos, Vivian Polar, Jeffery W. Bentle. Root, Tuber and Banana Food System Innovations. Springer, 2022. DOI: https://doi.org/10.1007/978-3-030-92022-7
3. Kalenska S., Dmytrishak M., Antal T., Mazurenko B., M. Я. Crop production with basis of fodder production, Kyiv, 2021. [In Ukrainian]


**Additional sources of information**


1. Crop production manual. FAO. 2020. Available at: https://www.fao.org/3/ca7556en/CA7556EN.pdf
2. Statistics in Agriculture. Available at: https://fao.org/faostat