

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

Department of agrochemistry and quality of plant products

APPROVED

Dean of the faculty

_____ O. L. Tonkha
“ _____ ” _____ 2022

CONSIDERED AND APPROVED

By the collective of the Department
of agrochemistry and quality
of plant products
report № 9, 16.05.2022

Heard of Department
_____ A. V. Bykin

CONSIDERED

Guarantor EP _____ O.L. Tonha

SYLLABUS OF THE SUBJECT

Control of the functional value for plant products

Specialty- 201 Agronomy

Educational program Agronomy

Faculty agrobiological

Syllabus compiled by: DPh in Agrochemistry, Associate Professor Nadia Bordyuzha

1. Description of the subject

Control of the functional value for plant products

(назва)

Field of the science, trend of the training, specialty, educational-qualification level		
Educational-qualification level	_____ Bachelor _____	
Specialty	201 Agronomy (шифр і назва)	
Educational program	201 Agronomy (шифр і назва)	
Description of the subject		
Kind	selective	
Whole of hours	150	
Amount of ECTS	5	
Amount of moodles	3	
Control	Exam	
Indexes of the subject for diurnal tuition and for tuition in correspondence course		
	diurnal tuition	tuition in correspondence course
Year of Training	_____ 4 _____	_____
Semester	_____ 8 _____	_____
Lectures	_____ 15 _____	_____ год.
Practis hours	_____	_____ год.
Laboratory hours	_____ 30 _____	_____ год.
Individual hours	_____ 108 _____	_____ год.
Individual tasks	_____	_____ год.
Amount of week hours for diurnal tuition: audience hours Individual hours –	3 год. 5 год.	

2. The goal and task of the course

The goal of the studding of the theoretical materials and laboratory classes are mastering for bachelor of the agronomy in theoretical knowledge and practical skills in basic of the protein metabolism, carbohydrates metabolism, lipids metabolism, vitamins complex formation, mineral complex formation into crops and their management during of the plant vegetation into modern crop production systems according to climatic conditions, weather conditions, **level** of oil fertility, sorts and hybrids features for improving of the functional value of crop products according to standards.

Having studied this subject student have to know:

- basis trends of development of plantgrower in Ukraine and abroad;
- peculiarities of plants nutrition and factors of formation of high products yield and high quality of plants products;
- specific using of results of soil diagnostic and plant diagnostic;
- specific using fertilizers in drip irrigation;
- optimization of plant nutrition with fertigation;
- complex method of changing optimal level of plant nutrition;
- system of fertilizers application;

- standards to the fertilizers.

Students have to be able:

- to organize and to make sampling of soil and sampling of substrate and sampling of plant; to analyze its;
- to give recommendation about using macrofertilizers and microfertilizers under the authority of agrochemical analysis;
- to calculate the rates of fertilizers for basic application and top dressing;
- to correct content of nutrients into substrate and into nutrient solution;
- to organize service of agrochemical laboratory;
- to organize and to make agrochemical research in condition of greenhouses;
- to propose components of substrate; to propose optimal microclimatic regimes according to plants nutrition;
- to find out assortment of fertilizers and assortment of fertilizers providers and assortment of equipment providers.

Practical skills:

General skills:

- Knowledge and understanding of the subject area and understanding professional activity;
- Ability to apply knowledge in practical situations;
- Skills to carry out safe activities;
- Ability to search, process and analyze information from various sources;
- Ability to work in a team;
- The desire to preserve the environment

Special skills:

- Knowledge and understanding of basic biological and agro-technological concepts, rules and theories related to growing agricultural and other plants;
- Ability to apply knowledge and understanding physiological processes of agricultural plants for solving production technological problems;

3. Programme and structure of the course

Name of the moodle and topics	Amount of hours					
	diurnal tuition					
	whole	include				
1		p	lab		Ind w	
1	2	3	4	5	6	7
Module 1. General principles of management of plant products in plant growing.						
Topic 1. Quality of plant products and system of management of plant products.	19	2		4		13
Topic 2. General principles of management of plant products.	18			2		16
Whole in module 1	37	2		6		29
Module 2. Control of Functional value for grain crops						
Topic 1. Management of functional value for grain of cereal.	14	2		4		8
Topic 2. Management of grain functional value of grainy.	22	2		4		16
Topic 3. Management of grain functional value of corn grain.	20	2		2		16

Whole in module 2	58	6		10		22
Module 3. Management of Functional value for Leguminous, industry crops, vegetables						
Topic 1. Management of grain functional value of Leguminous.	11	1		4		8
Topic 2. Management of functional value of oil crops.	13	2		6		6
Topic 3. Management of functional value of Sugar beet.	14	2				12
Topic 1. Management of quality of Potato.	9	2		2		5
Topic 2. Management of quality of Fruits and vegetables.	8			2		6
Whole in module 3	54	7		14		37
Whole	150	15		30		108

4. Topic of the laboratory classes

N п/п	Topic	Amount of hours
1	The identification of the nutrient's deficiency on plants.	4
	The determining of quality of gluten in grain of winter wheat.	4
2	The analysis in determination of starch with optical method.	4
	Determination of "raw" fat content in plants by fat-free residue method	4
3	The determination of acid value in seeds.	4
	The determination of Iodine Value for oils.	4
4	The determination of nitrates into potato and vegetables	2
5	The determination of general acidity in vegetables and fruits.	4
	Amount	30

5. Control questions, test blok for determination of the level of the student knowledge

- Control of the functional value for the sugar beet.
- Control of the functional value for the rape.

Test blok

	1. What are the basic tasks of technologies of management of quality of plant products?
1	The provision of conditions of plant growing according to its biological needs for getting high yield with high quality.
2	The provision of users needs to quality of plant products.
3	The adaptation of plant growing technologies to regional climatic conditions.
4	The optimization of resource provision of plant growing technologies.

75	2. Which standards must field have when potato is grown for chips on this field?
1	The absence of nematodes
2	High level of soil water
3	Same any standards are absent
4	Absence of soil insects and perennial weeds.

100	3. Which optimal content of physical clay must soil have if potato is grown for remaking on it?
1	

75	4. Why heavy soil is not optimal soil under growing of potato for remaking?
1	The yield include a great number of deform tubers and great number of untypical tubers and great number of damage tubers.
2	Does not provide optimal water regime
3	There are difficulties during planting and looking for and harvesting
4	The problems are coming in plant nitrogen nutrition and plant potassium nutrition

50	5. the best predecessor crop under potato is
1	Winter wheat
2	maize
3	potato
4	alfalfa

100	6. The plots that have very many weeds and that are using to grow potato need:
1	To till it and to cultivate it after 1 month.
2	To remove the stubble of predecessor plants in 1 or 2 events
3	To bring in whole covering herbicides after harvesting of predecessor plants
4	To cultivate soil in spring

100	7. The basic fertilization of potato need on light soils:
1	To deny from nitrogen application in autumn and maybe to apply rock phosphate meal in full rate and potassium fertilizers with a little of chlorine in 70-80% rate
2	To deny to nitrogen and phosphate fertilizers application but to apply potassium fertilizers beyond the control of form
3	To apply fertilizers without restriction and according to plan rates
4	Do not apply only liquid kinds of fertilizers

75	8. How many the fertilizers have to apply In basic application on dark-grey opodzolic soil under potato?
1	All elements have to apply in 70-80% of rate
2	All elements have to apply in 100% of planning rate
3	20 kg/ha of active matter of all elements
4	N-0-30, PK-70-80% from rate

100	9. Is it possible to change autumn ploughing on no-till tilage in growing of potato?
1	Yes, it is possible with on no-till tilage in deep 30-35 cm on middle granular types of soil
2	Yes it is possible without ridge- growing of potato
3	Under no circumstances
4	Yes it is possible if perennial weeds are absent in field.

75	10 The need of closing down of moisture in spring is causing with
1	Improving of water-air regime of soil
2	Saving of moisture in early spring time
3	Saving of moisture and it effect on quality of potato
4	Ability of speed up planting of potato because soil was warmed thoroughly

6. Methods of studied

Visual; laboratory; Practice, etc.

7. Control

The protection of laboratory results and tests

8 Parameters for estimation of students' knowledge

According to “Regulations about Module-Rating System of students' teaching and estimation of their knowledge” (NULES of Ukraine, 27.12.2019, #1371), student's knowledge are estimated in points (maximum 100) according to following table:

Student rating, balls	The definition ECTS mark	
	exam	Final test
90-100	Perfectly	Credited
74-89	Well done	
60-73	Satisfactory	
0-59	Bed	not credited

To determine the rating of the student (listener) for mastering the discipline R_{DIS} (up to 100 points) the obtained rating for certification (up to 30 points) is added to the rating of the student (listener) for academic work R_{NR} (up to 70 points): $R_{DIS} = R_{HP} + R_{AT}$.

8. Методичне забезпечення

1. Управління якістю продукції рослинництва: методичні вказівки до вивчення дисципліни. / І.У Марчук, Н.М. Бикіна, Н.П. Бордюжа. – К.: 2013. – 84 с.

9. Recommended literature

Basic literature

1. N. Bordyuzha. Management of quality of plant products in modern crop production system. Manual for laboratory classes. 2017. 66 p.
2. Прикладна біохімія та управління якістю продукції рослинництва. Городній М.М. Мельничук С.Д., Гончар О.М. та ін. / за ред. М. М. Городнього. – К.: Аристотель, 2005. – 484 с.
3. Управління якістю продукції рослинництва. Городній М.М., Кохан С.С., Матасар І.Т. та ін / За ред Городнього М.М. К.: Вид центр НАУ. 2001 243 с.

Additional literature

1. Агрохімічний аналіз: підручник. / М.М. Городній, А.П. Лісовал, А.В. Бикін та ін. / За ред. М.М. Городнього. – К.: Аристотель, 2005. – 456 с.
2. Добрива та їх використання: Довідник / [І.У. Марчук, В.М. Макаренко, В.Є. Розстальний та ін.]. – К., 2011. – 245 с.
3. Система застосування добрив: под ред. А.П. Лисовала. – К.: Вища школа, 2002. – 317 с.
4. Козлов М.В. Агрохімічне забезпечення високопродуктивних технологій вирощування зернових культур / М.В. Козлов, А.А. Плішко. – К.: Урожай, 1991. – 232 с
5. Кулаковская Т.Н. Почвенно-агрохимические основы получения высоких урожаев / Т.Н. Кулаковская. – Минск: Урожай, 1978. – 272 с.
6. Науково-методичні рекомендації з оптимізації мінерального живлення сільськогосподарських культур та стратегії удобрення / [М.М. Городній, О.І. Бондар, А.В. Бикін та ін.]; за заг. ред. М.М. Городнього. – К.: ТОВ “Алефа”, 2004. – 140 с.
7. Озимі зернові культури / [Л.О. Животков, С.В. Бірюков, Л.Т. Бабаянець та ін.]; за ред. Л.О.

Животкова і С.В. Бірюкова. – К.: Урожай, 1993. – 288 с.

8. Ягодин Б.А. Агрохимия / Б.А. Ягодин, Ю.П. Жуков, В.И. Кобзаренко. – М.: Колос, 2002. – 584 с.
9. Mitchel S.D. The basis for food production nutrients / S.D. Mitchel, 1985. –589 p.

10. INTERNET RECOURSES

ЕНК: Management of functional value for crop products.

<https://elearn.nubip.edu.ua/course/view.php?id=2293>

CONTENT OF SUBJECT

Program of the course

Module 1. General principles of management of plant products in plant growing.

Topic 1. Functional value of plant products and system of management of plant products.

The subject and task of course in management of quality of plant products. The meaning of course for agriculture such as factor for management of quality. Protect of environment and fertilizers application. The understanding of yield quality. Biological quality of products. Technological quality of products. Hygienic quality of products. The basic of sound nutrition. The prospects in developing of this course. Role nutrients and basic of sound nutrition. Quality of products and its kinds. The basic characteristics of biological and biochemical and technological quality of products.

Basic of standardization in plantgrower. The kinds of standards for plant products. Organization of control in product quality. State system of certification and control of product quality.

Topic 2. Functional quality and hygienic quality and technological properties of plant products. Proteins. Food value of its. Classification of proteins. The mean of every fraction of proteins in nutritive value of protein. Protein-gluten complex. Fat and lipids for people. Fat acids. Role of lipids in energetic metabolism. Carbohydrates. Role of its for metabolism. Water-soluble vitamins. Classification. Vitamin C (ascorbic acid). Sources of taking. The ways decreasing of losses it during cooking. Vitamin B. Role in carbohydrate metabolism. Vitamin B12. Vitamin PP. Vitamin B3. Vitamin B6. Vitamin B12. Role in blood formation process. Vitamin B7. Role in metabolism. Soul nutrition.

Topic 3. General principles of management of plant products. Quality of basic crops in Ukraine. Growing of high full value quality products. Control and admission of products. The influence of soil conditions and climatic conditions and effect of chemicalization means and of growing technologies and of sort on quality of plant products.

Module 2. Contorl of Functional value for grain crops

Topic 1. Contorl of Functional value of cereal. Graun industry in Ukraine. Food value of bread and bun. Vitamins in bread. Physical quality of grain of winter wheat. Specific weight of grain. Weight of 1000 seeds. Contamination by insects. Biochemical value and food value of grain. The effect of mineral nutrition on Content of protein and content of glutan in grain. Amino acids composition of grain protein. Ash content of grain. Technological quality of grain. Quality of row gluten. Classification of gluten. Bre4ad-making quality of wheat four. Quality of dough. Soil condition and temperature regime and moisture of air and quality of wheat grain. Correcting of nitrogen fertilizer rates according to recovery of spring vegetation of winter plants. Role of sort in formation of grain quality. Using od plant diagnostic for find out need in foliar application of wheat. Split application of nitrogen fertilizers. The effect of late nitrogen fertilizer application after planting. The effect of late microelements fertilizer application after planting. The influence of chemicalization on quality formation of grain. Nutritious Balance for growing of winter wheat and for spring wheat.

Spring barley and winter barley. Chemical composition of grain of barley. Technological properties of barley grain for groats industry. The standards to malting barley. The difference in quality of goat barley and of forage grain. The growing of malting barley.

Corn. It using such as fodder crop and as technical crops. Bochemical composition. The effect of mineral and organic fertilizers on its quality. Terms and methods of fertilizer application. Its effect.

Topic 2. Contorl of Functional value of grainy. Goats plants. biochemical quality of buckwheat and millet. The improving of quality of millet and of buckwheat under using of organic and mineral fertilizers.

Topic 3. Contorl of Functional value of Leguminous. Leguminous plants in agroculture. The quality of leguminous plants. Bochemical composition. The effect of mineral and organic fertilizers on its quality. Inoculation of grain.

Module 3. Management of industry crops.

Topic 1. Contorl of Functional value of oil crops. Sunflowers . biochemical composition of seeds. Physical and chemical properties of sunflower oil. Gropes of sunflower seeds according to acid

value. Climatic effect and fertilization effect and quality of seeds. Micronutrition.

Topic 2. Control of Functional value of Sugar beet. The industry of sugar in Ukraine. The nutrition of sugar beet. Chemical composition of beets. Standards to storage of sugar beet. Technological quality of beets. The technology of sugar production. A-amino-N. Refinate sugar yield. Good quality of sugar. The effect of weather on sugar content. physiological basis of increasing of sugar content. The influence of fertilizers on it. Rates and doses and terms and methods of fertilizer application. microfertilizers. Irrigation.

Topic 3. Control of Functional value of Flax. The qualitative indexes of flex. The fertilizer using in growing technology of flex.

Topic 4. Control of Functional value of Potato. Chemical composition of beets. Carbohydrates in tubers. Darkening of potato. The organic and mineral fertilizers in growth of potato. Liming.

Topic 5. Control of Functional value of Fruits and vegetables. Biochemical composition and qualitative indexes of its products. The influence of weather on formation of quality this crops. The effect of fertilization on quality of fruits and vegetables. Liing and microelements.