CATALOG OF ELECTIVE DISCIPLINES

6B08 - Agriculture and bioresources
(Code and classification of the field of education)

6B081 - Agronomy
(Code and classification of the direction of training)

0812
(Code in the International Standard Classification of Education)

B077 - Crop production
(Code and classification of the educational program group)

6B08101 - Agronomy
(Code and name of the educational program)

bachelor
(Level of preparation)

set of 2023

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Chairman of the Academic Council of the University D.Orynbekov

Pre-diploma practice

Discipline cycle	Profiling discipline
Course	4
Credits count	15
Knowledge control form	Total mark on practice

Short description of discipline
Carries out development of rational and resource-saving systems of agriculture; carries out agrotechnical actions for protection of soils from erosion and deflation; formation of professional competences; acquisition of skills of organizational and administrative work on management of agriculture. To solve organizational and economic issues in making adjustments to agricultural techniques, taking into account the prevailing weather conditions of a particular year.

Purpose of studying of the discipline
The purpose of the practice is the processing of experimental material collected during the period of industrial practice, the completion of research work and the writing of a thesis

Learning Outcomes
ON4 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.
ON9 To conduct field research experiments, to argue the results of research, to prepare all kinds of scientific works.

Learning outcomes by discipline
1. collection, processing and generalization of practical material on the topic of research work (project);
2. analysis of statistical data and practical material on the research topic;
3. formulation of conclusions, patterns, recommendations and suggestions on the topic of research work (project) or report.

Prerequisites
Production practice 2

Postrequisites
Final examination

Production practice 3

Discipline cycle	Profiling discipline
Course	4
Credits count	15
Knowledge control form	Total mark on practice

Short description of discipline
To use modern progressive technology of cultivation of spring, row crops, industrial crops; methods for determining the quality of seed material, selection and seed production; fundamentals of technology for storage and processing of crop products, including cereals, vegetables and other crops.

Purpose of studying of the discipline
The purpose of the practice is to consolidate theoretical knowledge in the courses of profile disciplines, to familiarize with the main production processes in agriculture and to prepare students for independent work in production in their specialty

Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.
ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
ON11 To produce nutrient medium to cultivate cells; to identify the saprophytic and pathogenic microorganisms, use of products of microbial synthesis.

Learning outcomes by discipline
1. collection, processing and generalization of practical material on the topic of research work (project);
2. analysis of statistical data and practical material on the research topic;
3. formulation of conclusions, patterns, recommendations and suggestions on the topic of research work (project) or report.

Prerequisites
Production practice 2

Postrequisites
Final examination

The basics of pathology

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline includes the study of the pathological process resulting from the interaction of the pathogen and the host plant. Examines anatomical and morphological changes in plants, physiological and biochemical disorders that occur in a plant affected by pathogens; the mechanism of action of the pathogen on plant cells by enzymes, toxins and other biologically active substances, the nature of the symptoms of the disease, growth disorders, changes in the shape of the entire plant or some of its organs, the structure and structure of tissues.

Purpose of studying of the discipline
Students receive professional training in the field of diagnostics of plant diseases, biological damage.and the organization of protective measures. Study of patterns of development and spread of plant diseases
Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.
Learning outcomes by discipline
1) apply a variety of methodological approaches to the modeling and design of varieties, plant protection systems, techniques and technologies for the production of plant products.
2) develop an observation program and conduct production experiments in the field of plant protection.
3) evaluate the condition of plants.
Prerequisites
Phytobiology
Postrequisites
Protection of crops from pests and diseases

General phytopathology

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
Formation of the basic concepts of plant diseases and causes. Considers the diagnosis of plant diseases, the basic ideas about the symptoms of diseases, the classification of plant diseases, the basics of biology and taxonomy of phytopathogenic fungi; features of biology and ecology of biological agents that cause plant diseases; main sources of plant infection; plant pathology, general patterns of development and spread of plant diseases; organization of protective measures against plant diseases.
Purpose of studying of the discipline
formation of knowledge and Skills in the biology of plant disease pathogens and their diagnosis.
Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.
Learning outcomes by discipline
1)to know the basic concepts, issues and problems of phytopathology, plant breeding for disease resistance, plant protection;
2)establish the diagnosis of the affected plant;
3) develop a work plan for carrying out protective measures in specific conditions;
Prerequisites
Phytobiology
Postrequisites
Protection of crops from pests and diseases

Agricultural Phytopathology

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
It is aimed at studying diseases of agricultural crops; systems of measures to protect crops from diseases; pathogens: actinomycetes, viruses, bacteria and fungi. Particular attention is paid to the search for ways to reduce the harm caused to agricultural production by phytopathogenic organisms, signs of diseases depending on the zone of plant growth, methods of protection; causes of diseases; features of the development of pathogens, methods of protection.
Purpose of studying of the discipline
To study the system of measures to protect crops from diseases. Pathogens of diseases: actinomycetes, basidiomycetes viruses, bacteria, etc.
Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.
Learning outcomes by discipline
1) Develop environmentally sound integrated plant protection systems and agrotechnical measures to improve the phytosanitary condition of crops.
2) Takes into account the economic thresholds of harmfulness when justifying the need for application.
3) Selects the optimal types, norms and terms of use of chemical and biological plant protection products for effective control of weeds, pests and diseases.
Prerequisites
Phytobiology
Postrequisites
Protection of crops from pests and diseases

Pests of agricultural crops

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying about pests of agricultural plants. Examines the biology of agricultural pests, methods against harmful organisms, protection of crops from harmful organisms. It includes quarantine, agrotechnical, biochemical, sanitary - preventive, physical and mechanical measures against harmful organisms of agricultural plants, damage caused by pests to crop yields and measures to protect crops from their mass development.

Purpose of studying of the discipline
to study the morphological and biological features of pests of agricultural crops and methods of plant protection from pests

Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.

Learning outcomes by discipline
1) know the species composition and biological characteristics of pests;
2) develop the necessary methods of plant protection from pests.
3) conduct phytopathological examination of agricultural crops.

Prerequisites
Agricultural Phytopathology

Postrequisites
Protection of crops from pests and diseases

General entomology

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
General information about the morphological, biological and ecological characteristics of insects is given. The taxonomy of the class of insects is considered; identification of representatives of the main orders, families, genera and species of insects; the influence of external factors on the development of insects; biotopic distribution; determination of the main trophic relationships of insects; identifying the role of beneficial insects; faunistic complexes of pests of major agricultural crops and systems of measures to combat them.

Purpose of studying of the discipline
to study the morphological and biological features of pests of agricultural crops and methods of plant protection from pests

Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.

Learning outcomes by discipline
1. To study the types of insects and effective measures to combat them.
2. To identify morphological and biological features of agricultural pests and the phenology of their development.
3. Determine the harmfulness of pests of agricultural crops. Apply pest control measures

Prerequisites
Agricultural Phytopathology

Postrequisites
Protection of crops from pests and diseases

Agricultural entomology

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
Forms the concept of agricultural plant pests, biological features of agricultural pests, methods of combating crop pests. The course includes: methods of plant protection from agricultural pests, quarantine measures, agrotechnical, biological, chemical, organizational and production measures, plant reactions to damage and pest control measures, reduction of crop losses from harmful insects.

Purpose of studying of the discipline
to study the morphological and biological features of pests of agricultural crops and methods of plant protection from pests

Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.
ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline

1) have theoretical knowledge about the structure, lifestyle and ecology of the main, practically important in agriculture, representatives of insect orders.
2) determine the necessary and sufficient measures to control agricultural pests.
3) diagnose insects by morphological and anatomical signs, as well as by the nature of damage to plants, and carry out a description of pests, determine the types of typical pests of agricultural crops.

Prerequisites

Agricultural Phytopathology

Postrequisites

Protection of crops from pests and diseases

The Parking management in agriculture

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

Gives an idea of the technical and economic assessment of a single machine, unit, system of machines, mechanized technologies for cultivating crops. It considers traction and transport energy means, devices and principles of operation of the main mechanisms and systems of tractors and cars. The practical part of the discipline is aimed at the development of a technological map, taking into account the provision of the economy with agricultural machinery, the acquisition of tillage units, the development of soil protection measures.

Purpose of studying of the discipline

To study the main types of agricultural machinery used for basic and surface tillage, sowing and planting, preparation and fertilization, post-harvest processing of grain and seeds of various crops; irrigation of agricultural land; loading and transportation of agricultural goods.

Learning Outcomes

ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline

In the course of theoretical classes, the student should know how to prepare the machine for productive and trouble-free operation. For example, the installation of teeth on a given seeding scheme, the installation of sowing machines on a given seeding rate (seeds, fertilizers) intended for continuous and row-to-row tillage,the installation procedure of the working bodies of cultivators.

Prerequisites

Introduction to the specialty

Postrequisites

Production practice 2

Agricultural machinery

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline demonstrates the study of agricultural machinery, the classification of aagricultural machinery for tillage, sowing, planting, tending and cleaning crops. Includes: adjustment of the main mechanisms and systems of tractors, agricultural machines; calculation of the need for material and technical means for the implementation of the production program; selection of an appropriate machine or tool for performing technological operations; rational acquisition of machine-tractor units, production lines.

Purpose of studying of the discipline

The study of the principles of classification of agricultural machines, the device, purpose, adjustment of agricultural machines used for tillage, sowing, planting crops, caring for them and harvesting.

Learning Outcomes

ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline

1) to know the main directions and trends in the development of agricultural machinery; principles of operation, purpose, device, technological and working processes, adjustments of agricultural and reclamation machines, their advantages and disadvantages;
2) possess techniques and methods of analyzing the technological process of agricultural machinery, assessing the quality indicators of its implementation.
3)Manage tractors and self-propelled agricultural machines of all kinds at agricultural enterprises

Prerequisites

Introduction to the specialty

Postrequisites

Production practice 2

Exploitation of machine-tractor Park

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at studying the essence of the rational use of tractor parks in agricultural enterprises. Examines the basics of the production operation of machines and aggregates, the acquisition of machine and tractor units, the choice of the method of organizing field work, ways to increase the coefficients of the useful action of aggregates, the highest annual productivity of power plants, maintenance in the machine and tractor fleet, methods of efficient consumption of combustible materials and auxiliary parts.

Purpose of studying of the discipline

The purpose of studying this course is to master the methods of organizing field work, develop an action plan to increase the efficiency of aggregates, establish technical service in the machine and tractor fleet.

Learning Outcomes

ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline

1) Determine the rational composition of the units and their performance indicators.
2)Perform maintenance work on tractors, agricultural machinery and equipment in workshops and maintenance points.
3)Manage tractors and self-propelled agricultural machines of all kinds at agricultural enterprises.

Prerequisites

Introduction to the specialty

Postrequisites

Production practice 2

Biological basis of crop protection

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at studying the biological characteristics of crops, creating favorable conditions for the growth and development of plants, and also considers crop cultivation technologies taking into account the biological characteristics of plants, the main distinguishing features of the intraspecific diversity of the main agricultural plants (wheat, barley, oats, peas, potatoes, perennial legumes and cereal grasses), factors that determine the growth and development of plants.

Purpose of studying of the discipline

to study the biological features of plant growth and development depending on environmental factors

Learning Outcomes

ON4 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.
ON5 Perform work on technologies to improve forage lands, fodder; to determine the methods and principles of activities on pastoral agriculture; to introduce advanced technologies of cultivation of agricultural crops taking into account biological features of plants.

Learning outcomes by discipline

1) to know the features of cultivation of agricultural crops with the use of agro-reclamation techniques, the specifics of farming systems, fertilizers, tillage;
2) make the right decisions about the method of regulating the water regime, taking into account the peculiarities of cultivating a certain crop in the appropriate soil conditions;
3) to substantiate the technologies of sowing crops and caring for them;

Prerequisites

Agricultural entomology Agricultural Phytopathology

Postrequisites

Crop production

Protection of crops from pests and diseases

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The formation of the concept of a system for the protection of crops from pests and diseases is based on a combination of preventive and extermination measures against diseases and pests. Considers the development of a set of measures to identify foci of diseases and pests, track the development of diseases, predict outbreaks of diseases and pests, measures to combat diseases and pests of crops, taking into account the climatic features of the region.

Purpose of studying of the discipline

The purpose of this discipline is to master students` knowledge, skills and abilities to identify diseases and pests of agricultural plants, prevent plant diseases and measures to combat diseases and pests of agricultural plants.

Learning Outcomes

ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.

Learning outcomes by discipline

1) know the species composition and biological characteristics of pests and diseases;
2) develop the necessary methods of plant protection from pests and diseases.
3) conduct phytopathological examination of agricultural crops.

Prerequisites

Agricultural entomology Agricultural Phytopathology

Postrequisites
Crop production

Phytopathology with immune system

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course is aimed at studying phytopathogenic organisms, the influence of the disease on the growth and development of plants, and the ccharacteristics of the immune system of plants. An idea is given about the signs of diseases, environmental causes and parasitic organisms that cause crop diseases, about the immunity of crops to diseases, the principles of plant resistance to diseases, the type of relationship between the parasite and plants, the organization of anti-protective measures against plant diseases, measures to increase plant resistance to diseases.

Purpose of studying of the discipline
formation of knowledge and skills in the biology of plant pathogens and their diagnostics. about the immunity of plants to diseases. principles of plant resistance to diseases.

Learning Outcomes
ON2 To carry out the prediction of the phases of crop development, weather conditions, the influence of factors on yield and to properly use them in agriculture; to describe the morphological characteristics of plant organs; knowledge of the essence of physiological processes taking place in the plant cell, biological features.
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.

Learning outcomes by discipline
To differentiate the features of pests and plant diseases; to show the role of immunity in resistance to various phytopathologies.
Identify methods and principles of measures to combat plant diseases and pests
Predict and prevent the spread of plant diseases and pests, taking into account immunity.

Prerequisites
Agricultural entomology Agricultural Phytopathology

Postrequisites
Crop production

Methods of scientific research in vegetable growing

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The methods and main stages of field and research work in agronomy are considered. Includes basic concepts and classification of research methods, the main elements of tIe methodology of field experience; generalization, systematization, analysis of experimental meterials and evaluation of the results of the experiment. Generalized material is given on the organization, methodology and technique of field experiment in a production environment, recommendations on the principles of planning observations and analyzes, taking into account the soil and climatic conditions of the study area

Purpose of studying of the discipline
To study the theoretical foundations of conducting research; to study the principles of methods of setting up experience; to master the methodology of the economic efficiency of the results of experience

Learning Outcomes
ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
ON9 To conduct field research experiments, to argue the results of research, to prepare all kinds of scientific works.

Learning outcomes by discipline
1) apply modern methods of scientific research in the field of vegetable growing.
2) apply regulatory documentation in the relevant field of knowledge.
3) to formalize the results of research and development work.

Prerequisites
Introduction to the specialty

Postrequisites
Methods of agricultural crops variety testing

Field experiment technique

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The methhods and main stages of field and research work in agronomy re considered. Includes basic concepts and classification of research methods, the main elements of the methodology of field experience; generalization, systematization, analysis of experimental materials and evaluation of the results of the experiment. Generalized material is given on the organization, methodology and technique

of field experiment in a production environment, recommendations on the principles of planning observations and analyzes, taking into account the soil and climatic conditions of the study area.

Purpose of studying of the discipline

to teach students to plan and conduct agricultural experiments, observations and accounting in conducted experiments

Learning Outcomes

ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
ON9 To conduct field research experiments, to argue the results of research, to prepare all kinds of scientific works.

Learning outcomes by discipline

1) choose a topic and determine the purpose and objectives of research, put forward a working hypothesis, develop a scheme and methodology for conducting experiments;
2) prepare a plot of land for laying field experience;
3) organize the laying of field experience, conducting observations, accounting, analyzing the results obtained.

Prerequisites

Introduction to the specialty

Postrequisites

Methods of agricultural crops variety testing

Fundamentals of scientific research in agronomy

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

Forms an idea of the methods of agronomic research. Includes: basic definitions and classification of research methods, fundamental elements of the field experiment methodology; planning and designing an agricultural experiment, methodology for laying and conducting a field experiment; rules for compiling a program of observations and records, a methodology for accounting for crop yields in an experiment, a procedure for maintaining documentation and reporting

Purpose of studying of the discipline

The purpose of the course "Fundamentals of scientific research in agronomy" is to consider the theoretical foundations of the most important methods of studying
the formation of crop yields.

Learning Outcomes

ON9 To conduct field research experiments, to argue the results of research, to prepare all kinds of scientific works.

Learning outcomes by discipline

- familiarization of students with general information about science and scientific research;
- teaching students methods and methodology of scientific research;
- assimilation by students of the methodology of registration of the results of research work;
- acquisition by students of the necessary knowledge in the field of presentation (defense) of research work (final qualifying work).

Prerequisites

Introduction to the specialty

Postrequisites

Methods of agricultural crops variety testing

Culture of plant cells

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

Forms concepts about growing cells in special nutrient media, the basic principles of cultivation, the peculiarities of cell cultivation. The discipline includes: a brief history of plant cell cultivation, conditions of cell cultivation, callus production and cultivation, dedifferentiation and appearance of callus, heterogeneity of cultured cells, cell growth in cultures, as well as the use of cell cultures, plant cell cultures.

Purpose of studying of the discipline

To study the conditions of cell cultivation, humidification of the environment, humidification of the environment. Obtaining callus and its cultivation. The use of cell culture to solve theoretical and practical issues of agronomy, the technology of cell isolation and cultivation.

Learning Outcomes

ON2 To carry out the prediction of the phases of crop development, weather conditions, the influence of factors on yield and to properly use them in agriculture; to describe the morphological characteristics of plant organs; knowledge of the essence of physiological processes taking place in the plant cell, biological features.
ON11 To produce nutrient medium to cultivate cells; to identify the saprophytic and pathogenic microorganisms, use of products of microbial synthesis.

Learning outcomes by discipline

1)To produce nutrient media, to cultivate cells;
2) be able to predict the consequences of the introduction of plants created by biotechnological methods;
3) use biotechnological techniques to increase the yield and sustainability of the most important crops

Prerequisites

Phytobiology

Postrequisites

Breeding and seed production of agricultural crops

The safety of transgenic plants

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying the stages of obtaining transgenic plants, the history of the development of transgenic plants, methods of transformation of plant cells. Examines the issues of vectors for plant transformation based on plasmid, methods of agrobacteria cocultivation, plant cloning, obtaining a nutrient medium, stages of obtaining transgenic plants, the history of the development of transgenic plants, methods of transformation of plant cells, assessment of the environmental safety of transgenic plants.

Purpose of studying of the discipline
To study the method of transformation of plant cells. Vectors for plant transformation based on plasmid. The method of cultivation by agrobacteria. Cloning of plants. Obtaining a nutrient medium. Stages of obtaining transgenic plants, the history of the development of transgenic plants, methods of transformation of plant cells.

Learning Outcomes
ON11 To produce nutrient medium to cultivate cells; to identify the saprophytic and pathogenic microorganisms, use of products of microbial synthesis.

Learning outcomes by discipline
1) to know the methods of obtaining transgenic plants, the specifics of their use in science and practice, the problems associated with their introduction into practice, the scientific and legal foundations of biosafety in bioengineering and the use of transgenic plants.
2) be able to find and analyze information about transgenic plants, assess the risks associated with the spread of transgenic plants.
3) possess knowledge about the nature of transgenic plants, methods and purposes of their creation, skills in developing research projects, participating in other projects, independent research work, deepening professional knowledge with the help of new information and educational technologies.

Prerequisites
Phytobiology

Postrequisites
Breeding and seed production of agricultural crops

Biotechnology crops

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline includes theoretical issues and practical results in plant biotechnology related to obtaining forms with new improved features. Considers the application of biotechnology methods in crop breeding, seed production and culltivation technology, microbiology of cells and tissues cultivated in an artificial nutrient medium, clonal microseparation and plant health, plant growth and formation regulators, basic principles of genetic engineering, application of in vitro methods in plant breeding.

Purpose of studying of the discipline
To study the biology of cells and tissues cultivated in an artificial nutrient medium, clonal micro- reproduction and plant health improvement, regulators of plant growth and development

Learning Outcomes
ON11 To produce nutrient medium to cultivate cells; to identify the saprophytic and pathogenic microorganisms, use of products of microbial synthesis.

Learning outcomes by discipline
1) know the basic techniques and methods of cellular and genetic engineering used in agriculture, cultivation of plant cells and tissues.
2) be able to use the basic techniques and methods of cellular and genetic engineering used in biotechnology.
3) Be able to grow agricultural plants "in viva" and "in vitro", cultivation of plant cells and tissues, the technique of microclonal reproduction of plants

Prerequisites
Phytobiology

Postrequisites
Breeding and seed production of agricultural crops

Agro soil science

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
Forms an idea of the agronomic features of soil types and their use. Examines the issues of soil fertility, soil modification during anthropogenic use, the origin, evolution and agronomic characteristics of the main types of soils, the reaction of humic substances with the mineral part of the soil, aerobic and anaerobic processes in the soil. Particular attention is paid to environmental, economic and legal problems of land use, soil protection.

Purpose of studying of the discipline

generalization of new theoretical knowledge about soils and their fertility, acquisition of practical skills in diagnostics and qualitative assessment of soils, agricultural production grouping and regulation of soil regimes.

Learning Outcomes

ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline

to study soils and their role in the life of plants and humans; the origin and composition of the mineral part of the soil; the scheme of the soil- forming process and the formation of soil fertility; composition, properties of soils, soil processes and regimes that determine fertility, their combination in different types of soils and regulation in agronomic practice;
soil zones of the Republic of Kazakhstan, genesis, classification, agronomic characteristics and ways to increase their fertility; accounting, evaluation, rational use and protection of soils.

Prerequisites

Soil science Inorganic and organic chemistry

Postrequisites

Agricultural reclamation

Agrochemistry

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course of this discipline includes: creating the best conditions for plant nutrition, taking into account the knowledge of the qualities of different types and structures of fertilizers, the personalities of their relationship with the soil, determining very effective forms, methods and timing of the introduction of fertilizers. Examines the quantitative and qualitative composition of macro - micro fertilizers, complex fertilizers, organic fertilizers, the impact of fertilizers on the environment, methods of agrochemical research.

Purpose of studying of the discipline

formation of knowledge, skills and practical skills on the basics of nutrition of agricultural crops, which are the scientific basis for the intensification of agricultural production due to economically sound, resource-saving and environmentally safe use of fertilizers

Learning Outcomes

ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline

1) be able to carry out the selection of soil and plant samples for analysis;
2) be able to conduct chemical analysis of soils, plants and fertilizers;
3) calculate the doses of fertilizers for the planned harvest, determine the method of their application for crops;

Prerequisites

Soil science

Postrequisites

Agricultural reclamation

Technology is the use of fertilizers

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

It is aimed at studying the main methods, terms and methods of technology for the use of fertilizers, taking into account the soil and climatic conditions of the region. Special attention is paid to the methods of forming favorable conditions for plant nutrition using fertilizers, the specifics of their interaction with the soil, the correct composition of the system of introduction of fertilizers of individual crops, crop rotation, the impact of various agrotechnical measures on the effectiveness of fertilizers, the advantages of using organic fertilizers and the development of technology; calculation of the fertilizer application rate

Purpose of studying of the discipline

The purpose of this course is to provide students with theoretical knowledge and practical skills in the use of fertilizers, teaching them how to create the best conditions for plant nutrition using fertilizers, the peculiarities of their interaction with the soil, the correct composition of the system of application of fertilizers for individual crops

Learning Outcomes

ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline

1) know: basic methods for determining fertilizer doses, development of fertilizer systems, annual and calendar plans for the use of mineral fertilizers and meliorants; methods for determining the economic efficiency of agrochemical measures
2) be able to: design systems, annual and calendar plans for the use of fertilizers and meliorants in agrocenoses, draw up technological schemes for their application, control the implementation of the fertilizer system in farms
3) possess methods of evaluating the effectiveness of the use of fertilizers and meliorants in agrocenoses, adjust the methods and timing of the application of mineral and organic fertilizers; methods of quality control of the work on the use of fertilizers and meliorants

Prerequisites

Soil science Inorganic and organic chemistry

Postrequisites
Agricultural reclamation

Appraisal and classification of soils

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying the principles of land valuation and soil bonification. Considers the classification and evaluation of soils by productivity, the production value of soil bonification, agricultural production grouping of soils; information on the structure of soil cover and long-term information on the yield of the main crops of agriculture, timed to specific soils, the development of agro-climatic justification for the placement of crops, the methodology for determining the score of bonit

Purpose of studying of the discipline
The purpose of the discipline is to form students` knowledge, practical skills and abilities (in accordance with the competencies being formed) about the theoretical foundations of regulating water, air, thermal and salt regimes of soils in combination with appropriate agricultural techniques to ensure optimal conditions for the growth and development of agricultural crops.

Learning Outcomes
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
ON10 To recognize the main types and varieties of soils, to justify the direction of their use in agriculture and methods of reproduction of fertility; determine the bonus point.

Learning outcomes by discipline
-to study the main provisions and methods of methods and technologies of soil-ecological assessment and soil bonification;
- acquisition of skills in soil bonitization, taking into account specific field conditions;
- to study the basic properties and characteristics of soils that closely correlate with crop yields;
- master methods for determining soil and environmental indicators of various types of soils;
- master the methods of assessing the level of soil fertility

Prerequisites
Soil science

Postrequisites
Agricultural reclamation

Bonitization and qualitative assessment of soils

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
This discipline is aimed at studying the general principles of grading and qualitative assessment of soils, a comparative assessment of soil quality, their potential fertility and productive capacity. Considers modern meethods of soil assessment, soil assessment according to I.I. Karmanov, soil assessment according to T.N. Kulakova, soil assessment according to V.D. Ivanov, issues of qualitative assessment of land for various soil and climatic regions, agro-industrial grouping of arable land and a recommended set of crops.

Purpose of studying of the discipline
To study the general principles and methods of bonitization and qualitative assessment of soils taking into account soil and climatic conditions.

Learning Outcomes
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
ON10 To recognize the main types and varieties of soils, to justify the direction of their use in agriculture and methods of reproduction of fertility; determine the bonus point.

Learning outcomes by discipline
1) to recognize the main types and varieties of soils, to justify the directions of their use in agriculture and methods of reproduction of fertility;
2)determine the bonus score;
3) be able to organize the rational use of land resources and determine measures to reduce the anthropogenic impact on the territory;

Prerequisites
Soil science

Postrequisites
Agricultural reclamation

Soil and plant diagnostics

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying the basics of diagnosing plant nutrition, the provision of plants with chemical elements, the influence of the chemical composition and biological characteristics of a variety on the growth rate and duration of vegetation periods. They consider carrying out plant diagnostics taking into account the history of fields, soil and agrochemical maps, the results of experiments and zonal recommendations for the use of fertilizers for a specific crop, the use of types of diagnostics: chemical, morpho-biometric, diagnostics of plant need for fertilizers.
Purpose of studying of the discipline
Ensuring constant control over growing conditions and adjusting plant nutrition during the growing season, which contributes to a more complete use of soil nutrients and fertilizers
Learning Outcomes
ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.
Learning outcomes by discipline
1) Determine the compliance of soil conditions with the requirements of cultivated crops; use agrotechnical techniques and fertilizers that increase soil fertility;
2) carry out weed mapping;
3) calculate the doses of fertilizers for the planned harvest, determine the method of their application for crops;
Prerequisites
Soil science
Postrequisites
Agricultural reclamation

Biological protection of plants

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
It is aimed at studying the methods and principles of measures to combat plant diseases and pests using biological objects - entomophages, herbiphages, pathogens and antagonists of the most important pests, weeds and pathogens of agricultural crops. Includes: occurrence, causes of development and forecasting, spread of diseases and pests, biological characteristics of pests and diseases, measures to combat them.
Purpose of studying of the discipline
to study the methods and principles of measures to combat plant diseases and pests, the basics of systematics, biology and ecology of the main groups of beneficial organisms-entomophages, herbifages, pathogens and antagonists of the most important pests, weeds and pathogens of agricultural crops; the causes of the dynamics of the number of harmful and beneficial arthropods in biocenoses; methods of their identification and diagnosis
Learning Outcomes
ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
Learning outcomes by discipline
1) Know the classification of organisms used for biological plant protection; advantages of using biological plant protection products.
2) develop and apply environmentally friendly technologies for the use of plant protection products.
3) create plant protection systems, substantiate environmentally safe crop cultivation technologies.
Prerequisites
Protection of crops from pests and diseases
Postrequisites
Plant quarantine

Integrated plant protection

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
This discipline is aimed at studying the system of managing the phytosanitary state of ecosystems, the integrated use of various means, measures of plant protection. Considers ensuring the phytosanitary well-being of the area and sustainable long-term suppression of the number of harmful organisms, regulation of the phytosanitary state of crops, cultivation of resistant highly productive varieties, activation of natural entomophages and acariphages, application of the biological method and the optimal use of pesticides and innovative mechanization.
Purpose of studying of the discipline
to form students` professional competencies in the field of comprehensive protection of agricultural crops from pests and diseases.
Learning Outcomes
ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
Learning outcomes by discipline
1)know a variety of methodological approaches in the modeling and design of integrated plant protection systems;
2) develop integrated plant protection systems against harmful organisms in adaptive landscape farming systems;
3) possess methods of assessing the state of agrophytocenoses of agricultural crops;
Prerequisites

Protection of crops from pests and diseases

Postrequisites

Plant quarantine

Chemical protection of plants

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

This discipline is aimed at studying methods of chemical protection and ways of effective use of chemical plant protection products. Examines the issues of agronomic toxicology, the selectivity of pesticides, the basics of sanitary and hygienic requirements for the use of pesticides. The classification of the main chemical plant protection products by the object of application, forms of chemical agents, calculation of the rate of application of chemicals, methods of application of pesticides, the mechanism of action of pesticides is given.

Purpose of studying of the discipline

The purpose of this course is to provide students with specific knowledge in the field of theory and practice of chemical plant protection

Learning Outcomes

ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline

1) Know the optimal types, norms and terms of use of chemical and biological plant protection products for effective control of weeds, pests and diseases.
2) take into account the economic thresholds of harmfulness when justifying the need for the use of pesticides.
3) conduct phytopathological examination of seeds, diagnose pests, plant diseases, and draw up technological schemes for protecting crops from them.

Prerequisites

Protection of crops from pests and diseases

Postrequisites

Plant quarantine

The radical improvement of meadows and pastures

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course is aimed at studying the systems of indigenous and surface improvement of meadows and pastures, methods and techniques of their rational use. The discipline demonstrates the conditions necessary for radical improvement, methods of tinning, a set of measures - cultural, meliorative and agrotechnical, the composition of grass mixtures. The description of the species composition of perennial grasses is given, taking into account the requirements for growing conditions in the main soil and plant zones.

Purpose of studying of the discipline

To study the biological features of forage crops and technologies of their cultivation in specific soil and climatic conditions. Types of feed. The concept of the fodder value of crops. Fundamentals of field and meadow forage production. Systems of their radical and superficial improvement, familiarization with methods and techniques of rational use of pastures and forage harvesting

Learning Outcomes

ON5 Perform work on technologies to improve forage lands, fodder; to determine the methods and principles of activities on pastoral agriculture; to introduce advanced technologies of cultivation of agricultural crops taking into account biological features of plants.

Learning outcomes by discipline

1) organize a system of cultural works to improve natural hayfields and pastures (clearing them of woody, shrubby, harmful and poisonous vegetation, surface layout, destruction of hummocks, etc.);
2) regulate and improve the water and nutrient regimes of hayfields and pastures, the care of delayed and grass meadows, as well as the comprehensive implementation of measures to increase the productivity of natural forage lands;
3) to create a scientifically-based system of care and use of seeded hayfields and pastures, development of wetlands, forests and other lands, accelerated tilling

Prerequisites

Forage production

Postrequisites

Production practice 2

Meadows and pasture farming

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course is aimed at studying the construction and management of pasture farming, mastering the skills of technologies for growing grass and conducting meadow farming. The types of plants of natural hayfields and pastures, technologies for growing grass forage crops, methods and principles of pasture management measures, measures to improve forage lands are considered. The classification and inventory of natural forage lands, a brief description of the natural grasslands of meadows and pastures of natural zones of

Kazakhstan are given.

Purpose of studying of the discipline

To study the management of pasture farming, mastering the skills of technologies for growing grass and conducting meadow farming

Learning Outcomes

ON5 Perform work on technologies to improve forage lands, fodder; to determine the methods and principles of activities on pastoral agriculture; to introduce advanced technologies of cultivation of agricultural crops taking into account biological features of plants.

Learning outcomes by discipline

1) know the varieties of meadow fodder plants zoned for the north-east of the country
2) organize the rational use of haymaking, pasture and green conveyor, storage, haylage and silage of grasses. Hay accounting and evaluation;
3) possess methods of forecasting the yield of meadow grass stands depending on the fertility of the soil."

Prerequisites

Forage production

Postrequisites

Production practice 2

Grassland forage production

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

It is aimed at studying the system for growing cultured natural forage vegetation on the appropriate types of forage lands in order to obtain the largest amount of pasture and stall feed per unit area. Explores the main constituent elements of grassland farming, biological and ecological foundations of grassland and pasture management, technologies of hay harvesting, the main natural zones and types of pastures and hayfields, ways to improve hayfields and pastures, rational use of pastures.

Purpose of studying of the discipline

To study the branches of forage production, types of feed, forage crops, rational use of forage lands and ways to increase their productivity

Learning Outcomes

ON5 Perform work on technologies to improve forage lands, fodder; to determine the methods and principles of activities on pastoral agriculture; to introduce advanced technologies of cultivation of agricultural crops taking into account biological features of plants.

Learning outcomes by discipline

1) Know the typology of meadows, the fodder characteristics of plants and the system of improving meadows;
2) Possess methods of assessing the economic characteristics of meadows.
3) organize the rational use of haymaking, pasture and green conveyor, storage, haylage and silage of grasses. Hay accounting and evaluation;

Prerequisites

Forage production

Postrequisites

Production practice 2

Vegetable growing of the closed soil

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline is focused on studying the technology of growing vegetables in greenhouses, mastering modern methods of growing vegetables in greenhouse conditions, determining the needs of vegetable crops for heat, air, the environment, and humidity. The discipline includes: the development of measures to combat diseases and pests of vegetable crops in greenhouses, increasing the economic efficiency of greenhouse production, increasing the yield, volume and selling price of vegetable crops.

Purpose of studying of the discipline

To study the types of greenhouses and greenhouses. Modern models of greenhouses and greenhouses. Requirements of vegetable crops for heat, air, environment, humidity.

Learning Outcomes

ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline

1) to know the ways of obtaining vegetable products, modern technologies for the production of vegetable products in the closed ground.
2) be able to manage the technological processes of production of vegetable production in the closed ground.
3) have the skills to perform technological techniques for growing vegetables in protected ground.

Prerequisites

Phytobiology

Postrequisites

Horticulture

Vegetable growing of open ground

Discipline cycle	Basic disciplines
Course	3

Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying the technology of growing vegetables in open ground, providing the population and the processing industry with vegetables, introducing the latest technologies for growing vegetables in open ground, the influence of environmental factors on the growth and development of vegetable crops. Considers the issues of drip irrigation technology, the use of zoned varieties, the use of materials for muiching, the use of a complex of fertilizers, chemical plant protection products.

Purpose of studying of the discipline
To study modern models of open ground. Requirements of vegetable crops for heat, air, environment, humidity. study their diseases and pests

Learning Outcomes
ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline
1) to know the ways of obtaining vegetable products, modern technologies for the production of vegetable products in the closed ground.
2) be able to manage the technological processes of production of vegetable production in the closed ground.
3) have the skills to perform technological techniques for growing vegetables in protected ground.

Prerequisites
Phytobiology

Postrequisites
Horticulture

Greenhouses

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying the national economic significance of grenhouses. An idea is given about the types of greenhouses depending on seasonal use, about the structures of greenhouses of the frame, hangar type, about the types of regimes in the greenhouse, about compliance with thermal and light regimes. Includes: the biological basis of vegetable growing and the classification of vegetable crops, the concept of varietal and sowing qualities of vegetable seeds, growing crops in a greenhouse

Purpose of studying of the discipline
Formation of theoretical knowledge on the biology of vegetable crops, organizational and economic features of protected soil and practical skills in the preparation and application of technologies for their cultivation in conditions of various types of cultivation facilities.

Learning Outcomes
ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline
1) to know the ways of obtaining vegetable products, modern technologies for the production of vegetable products in the closed ground.
2) be able to manage the technological processes of production of vegetable production in the closed ground.
3) have the skills to perform technological techniques for growing vegetables in protected ground.

Prerequisites
Phytobiology

Postrequisites
Horticulture

Agroforestry

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
It is aimed at studying the issues of design, creation and effective use of protective forest stands for various purposes in order to normalize the process of soil degradation. Considers the types of protective forest plantations, the influence of forest belts on the microclimate of the forested field, the totality of forestry measures aimed at improving the soil-hydrological and climatic conditions of the territory, the current state and prospects for the use of irrigated lands.

Purpose of studying of the discipline
The purpose of the discipline is the formation of theoretical knowledge and practical skills on the scientific and technological foundations of modern agroforestry.

Learning Outcomes
ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline
1) Know the methods of soil and ecological support of land management.
2) Be able to use practical skills and abilities aimed at improving agricultural land.
3) Possess the principles of rational use of land resources.

Prerequisites
Agrochemistry
Postrequisites
Reclamation agriculture

Chemical Reclamation

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course is aimed at studying measures to radically improve the chemical state and structure of soils with the help of special substances - chemical meliorants. The discipline considers a complex of reclamation measures to improve the chemical and physical qualities of soils; the current state and prospects for the use of irrigated lands; the concept of irrigation and irrigation systems, regimes, methods and techniques of irrigation of crops, methods of liming, gypsum and phosphorization of soils.
Purpose of studying of the discipline
Formation of knowledge on agrometeorology, irrigation reclamation, operation of reclamation systems, soil erosion and agroforestry and their use in professional activities for carrying out organizational, economic, technical, agrotechnical measures aimed at radically improving land, ensuring the sustainability and dynamism of agricultural production development, reducing its dependence on the influence of weather conditions.
Learning Outcomes
ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
Learning outcomes by discipline
1) know the basic algorithms for calculating the economic, energy and economic efficiency of the use of chemicals.
2) master the methodology of field and laboratory study of soils, plants
3) make environmentally sound chemical reclamation decisions.
Prerequisites
Agrochemistry
Postrequisites
Reclamation agriculture

Agricultural reclamation

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
Forms an idea about the branches of agricultural production, the main problem of which is considered to be a further increase in soil fertility, a steady increase in agricultural production based on the scientific use of irrigation and drainage, chemical land reclamation, cultural and technical activities. The course includes: the water regime of the active soil layer and its regulation; irrigation melioration; melioration of waterlogged mineral territories and swamps; soil cultivation, agricultural water supply and irrigation.
Purpose of studying of the discipline
- students receive theoretical knowledge and practical skills about the fundamental improvement of land, the essence of chemical, biological, irrigation and drainage reclamation and methods of their implementation; coverage of environmental issues, formation of ideas about the main types of reclamation, the need for reclamation work in Kazakhstan.
Learning Outcomes
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
Learning outcomes by discipline
1) to know modern and promising engineering methods of land reclamation (hydrotechnical, agro-reclamation, forest reclamation, etc.), principles of calculation of land reclamation measures and systems;
2) be able to reveal the internal relationship between specific engineering reclamation solutions and genetic features of the soil cover;
3) must understand the causal relationship of the changes taking place in the natural environment under the influence of reclamation measures, competently assess their consequences, present possible ways to optimize the regime of soil properties.
Prerequisites
Agrochemistry
Postrequisites
Reclamation agriculture

Adaptive plant-grower

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

Short description of discipline
It is aimed at the formation of theoretical knowledge and practical foundations of adaptive crop production, development, development

and introduction into production of economically reasoned technologies for the production of natural high-grade, environmentally safe agricultural products. It covers the main ways to increase yields and maximize agricultural products based on increasing soil fertility and introducing leading cultivation technologies, managing the main factors of plant life, carbon nutrition and ways to reduce the negative impact of environmental factors.

Purpose of studying of the discipline

to teach students to find rational effective developments, methods and methods aimed at solving complex problems of organizing and producing high-quality crop production in modern agriculture under any agro-climatic conditions.

Learning Outcomes

ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.
ON4 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline

"1) Determines the compliance of growing conditions with the requirements of agricultural crops (varieties).
2) develop fertilizer application systems taking into account soil properties and biological characteristics of plants.
3) Has methods of searching varieties in the register of zoned varieties."

Prerequisites

Phytobiology

Postrequisites

Production practice 3

Vegetable growing

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

Short description of discipline

It is aimed at teaching classification of vegetable crops, their origin, features of growth and development, selection and seed production of vegetable crops. The improvement of technologies of cultivation of vegetable crops in open and closed ground is given in relation to certain conditions. Focused on the study of world methods of growing vegetable crops in greenhouse conditions, the requirements of vegetable crops to environmental factors, diseases and pests of vegetable crops, measures to combat them.

Purpose of studying of the discipline

To study methods of growing vegetable crops in greenhouse conditions. Types of greenhouses and greenhouses. Modern models of greenhouses and greenhouses. Requirements of vegetable crops for heat, air, environment, humidity

Learning Outcomes

ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline

""1)know the biology and morphology of the main vegetable crops; seeds of vegetable crops; agrotechnics of the main vegetable crops; varieties of vegetable crops; factors for improving plant growth.
2) be able to grow seedlings; select fields for vegetable crops; select varieties for the conditions of the region; prepare seeds for sowing.
3) possess the skills of drawing up technological schemes for the cultivation of vegetable crops; techniques for selecting the assortment of vegetable crops for specific soil-ecological conditions."

Prerequisites

Phytobiology

Postrequisites

Horticulture

Horticulture

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

Short description of discipline

It focuses on the study of the cultivation of fruit and berry plants, zoned varieties and hybrids of vegetable and fruit crops, taking into account their biological characteristics. The importance of fruits and vegetables in the nutrition of humanity is revealed. Characteristics of fruit and vegetable crops, features of cultivation agrotechnics, selection and seed production of fruit, berry and vegetable crops, methods of protection against diseases, harmful organisms, weed control, features of mechanization of work in horticulture are given.

Purpose of studying of the discipline

Study fruits, berries and vegetables in human nutrition. Classification of fruit, berry and vegetable crops. Agricultural techniques of cultivation.

Learning Outcomes

ON2 To carry out the prediction of the phases of crop development, weather conditions, the influence of factors on yield and to properly use them in agriculture; to describe the morphological characteristics of plant organs; knowledge of the essence of physiological processes taking place in the plant cell, biological features.
ON8 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline

"1) to know the main types and varieties of fruit and vegetable plants suitable for cultivation in the territory of the Republic of Kazakhstan
2)know modern industrial technologies for the production of commercial fruits, vegetables and planting material;

3) be able to consciously apply the acquired knowledge when growing cultivated plants and get high, high-quality yields.
"

Prerequisites
Phytobiology
Postrequisites
Production practice 3

Breeding and seed production of agricultural crops

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

Short description of discipline
It is aimed at studying the anatomical, morphological characteristics of seeds of agricultural crops, development phases, the chemical composition of seeds, the distribution of fruits and seeds, methods for determining the quality of seed, seed purity, laboratory germination and seed germination energy, yield properties of seeds. Analyzes the process of seed formation, the physiology of the dormant seed, respiration and post-harvest maturation of seeds, the influence of environmental, agrotechnical factors on the yield and quality of seeds.
Purpose of studying of the discipline
To study seeds and fruits of agricultural crops, their formation and maturation.
Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.
Learning outcomes by discipline
1) to recognize by morphological features the genus, species and varieties of agricultural crops.
2) use modern methods of plant seed production;
3) organize work on growing seeds of agricultural crops;
Prerequisites
Fundamentals of scientific research in agronomy
Postrequisites
Pre-diploma practice Production practice 3

Methods of agricultural crops variety testing

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

Short description of discipline
Introduces the general provisions of the state variety testing, the organization of the territory of the state variety plot, the planning of variety testing, the main provisions for setting up small-plot experiments, the study of the elements of varietal technology, the features of testing varieties on reclaimed lands, production testing of varieties, observations and accounting during the growing season, harvesting and accounting for the crop. The concepts of seed and planting material, the technology of production of crop products and agricultural technology of variety testing, the immunological evaluation of varieties and hybrids are given.
Purpose of studying of the discipline
To study the general provisions of the state variety testing, planning of variety testing, the main provisions of setting small- scale experiments, elements of varietal technology, seed and planting material, laying and registration of experiments, observations and records during the growing season, harvesting and crop accounting.
Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.
Learning outcomes by discipline
"1) know the methodology of variety testing and approbation of agricultural crops,
2) to carry out testing of seed crops of agricultural crops.
3) own the organization of work on the preparation of seeds for sowing."
Prerequisites
Fundamentals of scientific research in agronomy
Postrequisites
Pre-diploma practice Production practice 3

Seed grower of vegetable cultures

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

Short description of discipline
It is aimed at studying the characteristics of sowing and planting material of plants, varietal and sowing qualities of seeds of vegetable crops. The main reasons for changing varietal properties in the process of species reproduction, methods for improving the properties of

seeds, technologies for the production and storage of seeds of individual crops, the organization of seed production of vegetable crops, carrying out variety change and variety renewal, creating seeds of the elite, the impact of environmental and agrotechnical conditions on the yield and quality of vegetable seeds are considered. plants.

Purpose of studying of the discipline

To acquaint students with modern methods and techniques of seed production. To analyze new progressive techniques for obtaining high yields of high-quality seeds of their harvesting, refinement and processing.

Learning Outcomes

ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.

Learning outcomes by discipline

""1) to recognize by morphological features the genus, species and varieties of vegetable crops.
2) use modern methods for seed production of vegetable plants;
3) organize work on growing vegetable seeds;"

Prerequisites

Fundamentals of scientific research in agronomy

Postrequisites

Pre-diploma practice Production practice 3

Agrolandscape farming system

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course focuses on the study of the regulation of key indicators and systems for the formation of agroecosystems in agro-landscape agriculture, compliance of agro- landscape agriculture with the requirements of nature protection and the system of environmental restrictions. The discipline includes: scientific concepts of the formation of agro-landscape agriculture, concepts and criteria for the development of aerolandscape agriculture, systematization of natural landscapes and agro-landscapes, promising goals of integrating agriculture to technogenic circumstances.

Purpose of studying of the discipline

To study the ways and methods of human influence on direct and indirect changes in natural landscapes, their use for the development of agriculture

Learning Outcomes

ON4 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline

"1) To know the morpho-genetic structure of landscapes and the laws of migration of substances and energy in landscapes; landscape components and their role in agriculture;
2) to use agricultural practices rationally in the fight against soil degradation, to make correct environmentally sound crop rotations, to plan and use comprehensive measures to protect the soil from erosion, to cultivate the soil in an environmentally sound manner, to comply with environmental restrictions in the farming system.
3) adapt tillage systems for crop rotation crops, taking into account fertility, steepness and exposure of slopes, groundwater level, fertilizers used and a complex of tillage machines."

Prerequisites

Agriculture

Postrequisites

Production practice 3

Rainfed agriculture

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at studying the development and improvement of methods of tillage on rainfed lands, the classification of rainfed lands. The discipline considers the system of agriculture and the characteristics of the water balance of the soil on a rainfed land, the agrotechnical significance of a fallow field on a rainfed land, the snow-accumulative role of stubble in flat-cut tillage, the influence of basic and summer fallow tillage on a semi-provided dry land, the effect of autumn tillage on soil fertility elements.

Purpose of studying of the discipline

familiarization of students with the factoriality of agriculture, laws and ecological principles is a theoretical basis as about the general laws for optimizing the factors of plant life for the formation of a high yield, preservation and improvement of soil fertility and a systematic approach to agriculture

Learning Outcomes

ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.

Learning outcomes by discipline

"1) to draw up schemes of various types and types of crop rotations;

2)apply comprehensive weed control measures;
3) determine the quality of tillage;"

Prerequisites

Agriculture

Postrequisites

Production practice 3

Precision farming basics

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course is focused on research on increasing the profitability of agricultural production by obtaining high yields and high-quality crop production products while reducing production costs and reducing the environmental burden on agroecosystems using digital methods and geoinformation systems. The general knowledge of traditional and adaptive landscape farming and the latest approaches of the current achievements of crop automation are considered.

Purpose of studying of the discipline

The main purpose of studying this course is to familiarize students with a comprehensive high-tech agricultural management system, including global positioning technologies (GPS), geographic information systems (GIS), yield assessment technologies (Yield Monitor Technologies), variable Rate Technology (Variable Rate Technology), remote sensing of the earth (remote sensing) and aimed at obtaining the maximum volume of high-quality and cheapest agricultural products, taking into account environmental safety standards.

Learning Outcomes

ON2 To carry out the prediction of the phases of crop development, weather conditions, the influence of factors on yield and to properly use them in agriculture; to describe the morphological characteristics of plant organs; knowledge of the essence of physiological processes taking place in the plant cell, biological features.
ON3 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline

1)To forecast the phases of crop development, weather conditions, the influence of factors on yield and to use them correctly in agriculture;
2) to assess the suitability of various agroecological groups of lands for the cultivation of agricultural crops using precision farming technologies for the production of high-quality products;
3)to use innovative processes in the agro-industrial complex in the design and implementation of environmentally safe and cost-effective technologies for the production of crop production and reproduction of soil fertility of various agricultural landscapes

Prerequisites

Agriculture

Postrequisites

Production practice 3

Legislation in the field of crop production

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline

It is aimed at studying the the oretical and practical foundations of regulatory documents (government decrees, technical regulations) necessary for agricultural specialists to work effectively in modern times. The basic laws in the field of crop production are considered; requirements for the safety of crop production; rules for the implementation of varietal and seed control; rules for subsidizing services in the field of crop production in various areas, conducting an examination of grain and issuing a grain quality passport.

Purpose of studying of the discipline

To form students with a system of fundamental knowledge necessary for the subsequent preparation of a bachelor, capable of working with normative legal documents in the field of legal regulation of agricultural activities, as well as the effective solution of practical problems of legal regulation of agricultural production, in accordance with the competencies being formed.

Learning Outcomes

ON1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Learning outcomes by discipline

"1) know the basic laws in the field of crop production.
2) To carry out grain expertise and issue a grain quality passport.
3) to carry out varietal and seed control."

Prerequisites

Bases of economics, law and ecological knowledge

Postrequisites

Pre-diploma practice

Estimation and setting of norms of quality of plant-grower products

Discipline cycle	Profiling discipline
Course	4
Credits count	5

Knowledge control form	Examination

Short description of discipline
The course focuses on the study of the theoretical and practical foundations of assessing and rationing the quality of crop products, covers the basic concepts of quality and product expertise, the nomenclature of consumer properties, indicators and gradations of quality, organoleptic, laboratory, computational, experimental methods for determining the quality of crop products. Information is given on the rationing and examination of the quality of grain processing products, oilseeds, vegetables, the system of standardization of crop production.

Purpose of studying of the discipline
To acquaint students with theoretical knowledge and to instill in them practical skills on the issues of quality assessment of agricultural products so that they can apply them in production.

Learning Outcomes
ON4 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline
"1) to know the biological features of agricultural crops and the technology of their cultivation, the method of harvesting and laying it for storage.
2) to substantiate the technology of sowing crops and caring for them, the method of harvesting and laying it for storage.
3) master the complexes of national, interstate, international standards and technical conditions for crop production and methods of quality determination;"

Prerequisites
Bases of economics, law and ecological knowledge

Postrequisites
Pre-diploma practice

Standardization and certification of crop production

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline
This discipline studies the basics of standardization, metrology, assessment of product quality compliance with requirements and regulatory documents, product safety, consumer properties of agricultural products, quality regulation. It includes: general characteristics of standards of different categories and types, general characteristics of technical regulation, the concept of technical regulations, sanitary and hygienic requirements for product safety, organizational and methodological foundations of standardization, quality and consumer properties of products, standardization of crop production.

Purpose of studying of the discipline
Formation of ideas, knowledge, skills in the field of standardization and metrology, certification, consumer properties of crop products, quality regulation, formation of skills and skills of working with standards and other regulatory documents, expert evaluation of the quality of crop products.

Learning Outcomes
ON4 To develop technological maps of cultivation of agricultural crops taking into account soil and climatic conditions and biological features of agricultural crops; to prove a method of harvesting of crops, primary processing of crop production and its laying on storage.

Learning outcomes by discipline
"1) Know the organizational and methodological foundations of standardization, metrology, certification.
2) Classify products and the technological process of their production in accordance with the requirements of regulatory documents.
3) possess modern methods of assessing the quality of agricultural products;"

Prerequisites
Bases of economics, law and ecological knowledge

Postrequisites
Pre-diploma practice

Plant quarantine

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is focused on the study of methods for recording and identifying quarantine objects, on a brief description of the morphology and biology of external and internal quarantine objects, as well as signs of damage to plants by pests and symptoms of diseases. Considers methods for identifying, localizing and eliminating quarantine objects, phytosanitary risk analysis, inspection methods for quarantine products, examination of quarantine materials, methods for disinfecting quarantine products and measures to combat them.

Purpose of studying of the discipline
Formation of students` understanding of quarantine pests, diseases and weeds on the territory of the Republic of Kazakhstan and in neighboring countries

Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.

Learning outcomes by discipline

- Getting used to meeting the economic threshold of harmfulness
- Ability to carry out measures currently used to protect plants from quarantine and especially dangerous pests.
Formed competencies: Development of a system of plant protection measures; conducting a survey of agricultural land for the presence of pests and diseases of crops. Compliance with the Law of the Republic of Kazakhstan "On Plant Quarantine"; application of production theory.

Prerequisites
Protection of crops from pests and diseases

Postrequisites
Production practice 3

Signaling and forecasting the development of pests and diseases of agricultural crops

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline
Forms a general concept of the forecast, the role of forecasting the spread and development of harmful organisms, the history of the development of the forecast service. Considers the forms of forecasts of the phytosanitary situation and signaling the timing of the fight against plant diseases and pests used in plant protection, the theoretical foundations for the development of forecasts, the principles of organizing work on the diagnosis, forecasting the spread of pests and diseases of crops and signaling the timing of their fight.

Purpose of studying of the discipline
To teach students to build complex systems for the protection of major crops, including agrotechnical, mechanical, physical, biological and chemical measures, which should be based on predicting the level of development of harmful organisms and their harmfulness, based on biotic and abiotic factors.

Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.

Learning outcomes by discipline
"1) To know the theoretical foundations of the development of forecasts and signaling in plant protection.
2) Conduct phytosanitary monitoring of agricultural crops for the detection of diseases and pests.
3) Have the skills to make a forecast of the development of harmful organisms based on the results of phytosanitary monitoring."

Prerequisites
Protection of crops from pests and diseases

Postrequisites
Production practice 3

Diagnostics of quarantine organisms and control measures

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline
Forms the concept of methods for diagnosing quarantine organisms that are common and have quarantine significance for the territory of the Republic of Kazakhstan. Considers the bioecological and morphological features necessary for the identification of quarantine species of diseases and pests. Information is given on the area of distribution, the nature of harmfulness, methods of diagnosis, detection and identification, phytosanitary measures and measures to combat these harmful organisms, and the basics of quarantine disinfection.

Purpose of studying of the discipline
Formation of knowledge and skills to protect the plant resources of Kazakhstan from importation from foreign countries and the spread of quarantine and other particularly dangerous harmful organisms.

Learning Outcomes
ON6 Develop systems of measures for plant protection; conduct surveys of agricultural land for pests and diseases of crops, identify the main types of pests and diseases; to carry out all types of breeding works taking into account the basic laws of genetics; to determine varietal and sowing qualities of seeds.

Learning outcomes by discipline
"1) know the evolution, nomenclature and classification of infectious diseases;
2) to prevent the occurrence of quarantine diseases of plants.
3) develop and implement a set of planned and emergency preventive and liquidation-health quarantine measures in crop production."

Prerequisites
Protection of crops from pests and diseases

Postrequisites
Production practice 3

Reclamation agriculture

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline
STudies the impact of land reclamation work on the environment; rational use of land and water resources; development of an irrigation regime depending on the type of cro3s; proper use of irrigation equipment; control and improvement of the ameliorative state of irrigated territories, a set of organizational, economic and technical measures to improve the quality of hydrological, soil and agro-climatic criteria, increase the productivity of the use of land and water resources in order to obtain high and stable crop нields.
Purpose of studying of the discipline
The purpose of this course is to familiarize with the methods of reclamation treatment and its impact on fertility, on the phytosanitary condition of the soil, on crop yields.
Learning Outcomes
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
Learning outcomes by discipline
1) to know the production and genetic classification of soils; the main types and varieties of soils, to assess the level of their fertility, to justify the direction of soil use in agriculture;
2) be able to: determine the basic properties of the soil, choose various reclamation measures taking into account the type of soil and the landscape of the territories
3) possess the skills of using different types of soils in agricultural production, methods of soil conservation and reproduction
Prerequisites
Agricultural reclamation
Postrequisites
Production practice 3

Irrigation farming systems

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course studies irrigation systems and its elements, methods of irrigation, the impact of the irrigation system on soil fertility. Surface methods of irrigation of agricultural crops, sprinkling irrigation, methods of combating soil salinization during irrigation are considered. Information is glven on tће operation of irrigation systems, the formation of swamps and waterlogging of lands, types of water supply, methods and ways of draining swamps and waterlogging of lands.
Purpose of studying of the discipline
The purpose of this course is to familiarize with the types of irrigation systems and its elements, irrigation methods, methods and methods of drainage and waterlogging of land.
Learning Outcomes
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
Learning outcomes by discipline
"1) to know the theoretical foundations of the regulation of water and associated air, food, heat and salt regimes of soils in combination with appropriate agricultural techniques to ensure optimal conditions for the growth and development of crops;
2) draw up tasks for the design of irrigation and drainage systems, economic water use plans and water regime regulation plans;
3) substantiate the effectiveness of the functioning of reclamation systems;"
Prerequisites
Agricultural reclamation
Postrequisites
Production practice 3

Irrigated agriculture

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline forms the concepts of the biological and agrotechnical foundations of irrigated agriculture, basic information about irrigation systems and its elements, methods of surface irrigation of crops, installation of sprinkling units. Considers the issues of introducing measures to combat soil salinity during irrigation, the state of water resources and their transboundary nature, ways to preserve soil fertility with the mandatory introduction of crop rotation of crops.
Purpose of studying of the discipline
To study the features of irrigation in various agricultural zones, types and methods of irrigation, features of cultivation of agricultural crops during irrigation.
Learning Outcomes
ON7 To use methods and principles of measures for biological control of diseases and pests of plants, to plant biological objects; to use the technology of cultivation of vegetable crops in open and protected grounds; scheduling of the work in greenhouses and greenhouses.
Learning outcomes by discipline
"1) to know the agroecological basics of farming systems on irrigated lands, the design and implementation of irrigated crop rotations, irrigated soil treatment systems and ways to minimize it, agrochemical techniques for regulating soil fertility and protecting plants from weeds, agro-reclamation techniques for regulating soil moisture and protecting soils from salinization and waterlogging, technologies for cultivating irrigated crops, environmental aspects when using irrigated lands.
2) to develop a schedule for irrigation and a consolidated plan for the organization of irrigation techniques, to make a set of measures to

obtain high planned yields of irrigated crops, to comply with a scientifically based irrigation regime for agricultural crops, to comply with environmental criteria in the use of irrigated land.
3) possess methods for calculating moisture reserves in the soil, total water consumption, elements of irrigation regime, irrigation timing in compliance with the principles of reproduction of soil fertility, weed control, compilation of scientifically based crop rotations of agricultural crops. "

Prerequisites

Agricultural reclamation

Postrequisites

Production practice 3