

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
POLTAVA STATE AGRARIAN UNIVERSITY
Department of Plant Breeding, Seed Production and Genetics**

Syllabus of educational course

**GENETICALLY MODIFIED ORGANISMS (GMO): THEIR
DISTRIBUTION AND USE**



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Form description of the education course and information about the authors

Name of the primary discipline	Genetically modified organisms (GMO): their distribution and use
Name of the structural department	Department of Plant Breeding, Seed Production and Genetics
Contact information	<i>Lector: Batashova Maria, Makaova Bohdana</i> <i>Office: Department of Plant Breeding, Seed Production and Genetics</i> <i>e-mail: mariia.batashova@pdaa.edu.ua</i>
Prerequisites for education course	English language (not low than A2 level)
Education level	Master degree

Course goals: understanding of genetic engineering and biotechnologies; learning of plants transformation techniques; understanding pros and cons of GMO.

Course tasks: understanding and studying of the concept of genetic engineering including the techniques, applications and limitations; understanding of the effect of genetic engineering on agriculture and biology, mastering scientific terminology in English and skills of its practical use in their professional activities.

Competences:

General:

ZK 1 - the ability to abstract thinking, analysis and synthesis

ZK 2 - ability to work in an international context

ZK 2 - Ability to think critically, generating new complex ideas, analysis and synthesis of science knowledge;

ZK 6 - knowledge and understanding of the subject area and understanding of professional activity

ZK 7 - the ability to apply knowledge in practical situations

ZK 9 - the ability to search, process and analyze information from various sources

ZK 11 - the desire to preserve the environment.

Professional:

FK 3 - knowledge and understanding of basic biological and agro-technological concepts, rules and theories related to the cultivation of agricultural and other plants.

FK 4 - the ability to apply knowledge and understanding of physiological processes of agricultural plants to solve production technological problems
 FK 6 - the ability to apply methods of statistical processing of research data related to technological and selection processes in agronomy.

Program learning outcomes:

PRN 6. Demonstrate knowledge and understanding of the principles of physiological processes of plants, to the extent necessary for the development of fundamental and professional disciplines.

PRN 8. To have at the operational level methods of observation, description, identification, classification, as well as cultivation of objects and maintaining the stability of agrocenoses while preserving natural diversity.

Education course program:

- Topic 1. The concept of genetic code and genetic variability**
- Topic 2. History of Gene engineering**
- Topic 3. Methods of creating genetically modified organisms**
- Topic 4. Genetically Modified Organisms in Industry**
- Topic 5. Genetically Modified Organisms in Agriculture**
- Topic 6. GM-crop: distribution and economical effect**
- Topic 7. Regulations and features of implementation of GM-crop**
- Topic 8. Genetically Modified Organisms controversies**

Assessment of learning outcomes

Program learning outcomes:	Forms of control
PRN 6. Demonstrate knowledge and understanding of the principles of physiological processes of plants, to the extent necessary for the development of fundamental and professional disciplines.	Asking and discussion, performing laboratory work and their defense, performing tasks of independent work.
PRN 8. To have at the operational level methods of observation, description, identification, classification, as well as cultivation of objects and maintaining the stability of agrocenoses while preserving natural diversity.	Asking and discussion, performing laboratory work and their defense, performing tasks of independent work.

Form of control of learning outcomes

Program learning outcomes	Asking and discussion		Seminar work		Independent work		Control		Total	
	Minimum number of points	Maximum number of points	Minimum number of points	Maximum number of points	Minimum number of points	Maximum number of points	Minimum number of points	Maximum number of points	Minimum number of points	Maximum number of points
PRN 6.	7	10	7	10	8	15	8	15	30	50
PRN 8.	7	10	7	10	8	15	8	15	30	50
Total	14	20	14	20	16	30	16	30	60	100

Forms, scale and criteria for assessing the learning outcomes of higher education students full-time study

Points	Assessment criterion
<i>Asking and discussion</i>	
0	No answer
2	Partial answer of the student and available lecture notes
4	Complete answer of the applicant and available full conspectus of lectures
<i>Performing of seminal works and their defense</i>	
1	The student completed the task of laboratory work
2	The student completed the task of laboratory work with the report, provided a conclusion of the work performed and a short answer to the control questions with significant errors
3	The student completed the tasks of laboratory work with the report, provided a conclusion of the work performed and an incomplete answer to the control questions
4	The student completed the tasks of laboratory work with the report, provided a conclusion of the work performed and a complete answer to the control questions
<i>Tasks of independent work</i>	
1	The student provided a short answer with significant errors

5	The student provided an incomplete answer
10	The student provided a broad answer with examples

Form of semester control of higher education students in accordance with the work curriculum

Scheme of accrual of points in the education course

Name of topic	Form of evaluation of learning outcomes				
	Asking and discussion	Performing of seminal works	Independent work	Essay	Total
Topic 1. The concept of genetic code and genetic variability	2,5	5	4		11,5
Topic 2. History of Gene engineering	2,5	5	4		11,5
Topic 3. Methods of creating genetically modified organisms	2,5	5	3		10,5
Topic 4. Genetically Modified Organisms in Industry	2,5	5	4		11,5
Topic 5. Genetically Modified Organisms in Agriculture	2,5	5	3		10,5
Topic 6. GM-crop: distribution and economical effect	2,5	5	4		11,5
Topic 7. Regulations and features of implementation of GM-crop	2,5	5	4		11,5
Topic 8. Genetically Modified Organisms controversies	2,5	5	4		11,5
Final Control (essay)				10	
Total	20	40	30	10	100

Total number of hours - 90 hours.

Number of Credits - 3.

Form of evaluation of learning outcomes – essay