SZKOŁA GŁÓWNA GOSPODARSTWA WIEJSKIEGO

Weed Science

Educational subject description sheet

Basic information

Field of study Biotechnology	**Didactic cycle** 2024/25
Speciality -	**Subject code** BBTBTjS_D.320K.01628.24
Organizational unit Faculty of Biology and Biotechnology	**Lecture languages** english
Study level first cycle (engineering degree)	**Mandatory** Elective subjects
Study form full-time studies	**Block** Major subjects
Education profile General academic	**Disciplines** Biological sciences

Coordinator	Marta Stankiewicz-Kosyl
Teacher	Marta Stankiewicz-Kosyl

Period	**Examination**	**Number of ECTS points**
Semester 6	Exam **Activities and hours** Lecture: 15 Auditorium exercises: 25 Field exercises: 5	4

Goals

Code	Goal
C1	To acquaint students with the knowledge of the biology and competition of weeds occurring in plant crops. Presentation of control methods, especially chemical methods based on herbicides: their proper application and the fate of these substances in the plant and the environment.

Entry requirements

The student should have knowledge of botany, molecular biology and plant physiology. He should be able to carry out a simple experiment on plant material.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	the weeds that are the most common in our agriculture	BTj_K3_W09, BTj_K3_W10	Written exam, Written credit, Oral credit, Assessment of activity during classes
W2	the field of biology and weed competition	BTj_K3_W06, BTj_K3_W08, BTj_K3_W09, BTj_K3_W10	Written exam, Written credit, Assessment of activity during classes
Skills – Student can:			
U1	propose a method of weed control appropriate to the state of weed infestation	BTj_K3_U02_inz, BTj_K3_U04_inz, BTj_K3_U07, BTj_K3_U14_inz	Written exam, Written credit, Assessment of activity during classes
U2	explain the molecular mechanism of weed resistance to herbicides	BTj_K3_U04_inz, BTj_K3_U14_inz, BTj_K3_U17	Written exam, Written credit, Assessment of activity during classes
Social competences – Student is ready to:			
K1	predict the extent of the negative impact of chemical methods on plants and the environment	BTj_K3_K03, BTj_K3_K06	Written exam, Written credit, Assessment of activity during classes

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	The positive role of weeds. Weed biology, with particular emphasis on weed resistance to herbicides. Agrotechnical, mechanical, physical and biological methods of weed control. Chemical methods of weed control. Behavior of herbicides in soil. Ingress and metabolism of herbicides in the plant. Mechanisms of action of herbicides. Natural herbicides. Photodynamic herbicides. Acetolactate synthesis inhibitors. Adjuvants - substances supporting the action of foliar and soil herbicides. Ecological infrastructure.	W1, W2, U1, U2, K1	Lecture
2.	Introduction to herbology; weed competition test. Outdoor activities. Weed seed studies. Characteristics of perennial and short-term weeds, ecological groups of field weeds, allelopathy test. Identification of weed species at various stages of development. Chemical and non-chemical methods of fighting weeds, test for the penetration of foliar herbicides into the plant. Characteristics of herbicides from various chemical groups. Commentary on the Plant Protection Program	W1, W2, U1, U2, K1	Auditorium exercises, Field exercises

Course advanced

Activities	Methods of conducting classes
Lecture	Lecture
Auditorium exercises	Conversation lecture, Laboratory (experiment), learning by experiment, Observation, Measurement
Field exercises	Field observations

Activities	Examination method	Percentage
Lecture	Written exam	40%
Auditorium exercises	Written credit	40%
Auditorium exercises	Assessment of activity during classes	5%
Field exercises	Oral credit	10%
Field exercises	Assessment of activity during classes	5%

Activities	Credit conditions
Lecture	The following scale is used to calculate the final score: 100-91% points - 5.0, 90-81% points - 4.5, 80-71% points - 4.0 70-61% points - 3.5, 60-51% points - 3.0
Auditorium exercises	The following scale is used to calculate the final score: 100-91% points - 5.0, 90-81% points - 4.5, 80-71% points - 4.0 70-61% points - 3.5, 60-51% points - 3.0
Field exercises	The following scale is used to calculate the final score: 100-91% points - 5.0, 90-81% points - 4.5, 80-71% points - 4.0 70-61% points - 3.5, 60-51% points - 3.0

Literature

Obligatory

1. Zimdahl, R. L. (2018). Fundamentals of weed science. Academic Press. San Diego, USA
2. Review papers in English proposed by the lecturer
3. https://www.weedscience.org/Home.aspx

Optional

1. Stankiewicz-Kosyl, M., Synowiec, A., Haliniarz, M., Wenda-Piesik, A., Domaradzki, K., Parylak, D., ... & Praczyk, T. (2020). Herbicide resistance and management options of Papaver rhoeas L. and Centaurea cyanus L. in Europe: A review. Agronomy, 10(6), 874.
2. Stankiewicz-Kosyl, M., Wrochna, M., Salas, M., & Gawroński, S. W. (2017). A strategy of chemical control of Apera spicaventi L. resistant to sulfonylureas traced on the molecular level. Journal of Plant Protection Research.
3. Peters, K., Breitsameter, L., & Gerowitt, B. (2014). Impact of climate change on weeds in agriculture: a review. Agronomy for sustainable development, 34, 707-721.
4. Kniss, A. R. (2017). Long-term trends in the intensity and relative toxicity of herbicide use. Nature communications, 8(1), 1-7.

Calculation of ECTS points

Activity form	Activity hours*

Lecture	15
Auditorium exercises	25
Field exercises	5
Preparation for the exam	20
Preparation for the test	15
Self-study on the content covered in class	5
Preparing the project	15
Student workload	**Hours** 100
Number of ECTS points	**ECTS** 4

* hour means 45 minutes

Effects

Code	Content
BTj_K3_K03	The graduate is ready to for safe work via the selection and application of a proper technique of handling, storing and disposing of laboratory materials (e.g. using proper techniques in terms of handling, storing and disposing of bacteria, chemical substances and dangerous bio-waste);
BTj_K3_K06	The graduate is ready to presenting justified arguments supporting one’s standpoint regarding scientific, ethical and social topics influencing the progress in biological sciences;
BTj_K3_U02_inz	The graduate can perform and present an independent experiment (a final diploma thesis), which reflects features such as: e.g. competences associated with the ability of proper time management, solving a research problem as well as performing tasks and interpreting the quality of results;
BTj_K3_U04_inz	The graduate can present and discuss key principles of scientific interdisciplinary bases, as well as a multidisciplinary approach to the processes and mechanisms of life;
BTj_K3_U07	The graduate can follow proper principles of safety and work ethics during the execution of scientific research using various experimental methods under laboratory and field conditions
BTj_K3_U14_inz	The graduate can translate the results of experiments into practical solutions;
BTj_K3_U17	The graduate can analyse topics from genetics and molecular biology, provide and explain certain detailed examples;
BTj_K3_W06	The graduate knows and understands the functions of various cells (prokaryotic and eukaryotic), being able to critically explain, how their properties are related to varying biological functions, knowing how they can be tested experimentally
BTj_K3_W08	The graduate knows and understands the features of cellular metabolism and its control, including the knowledge of certain experimental techniques;
BTj_K3_W09	The graduate knows and understands living organisms and their place in the natural environment, and how they can be used for the good of humanity;
BTj_K3_W10	The graduate knows and understands terms, principles and theories related to processes and mechanisms which have shaped the world of nature, knowing how they can be used efficiently;