

## DESCRIPTION OF THE DOCTORAL STUDY SUBJECT OF AGRONOMY SCIENCES FIELD

**Administrator of doctoral study program:** Vytautas Magnus University Agricultural Academy and Lithuanian research centre for Agriculture and forestry

**The coordinator of study subject - Agriculture and food sciences institute**

**Course code:** AGR8002

**Name in English:** Crop Product Biology

**Number of ECTS credits:** 8, 214 h, of which for contact work 58 h., for shelf-study 156 h

### **Course workload structure and hours:**

<i>Type of contact work</i>	<i>Hours</i>	<i>Self-study</i>	<i>Hours</i>
Lectures	54	Control works	20
Practical	-	Practical works	-
Consultations	2	Individual assignment	30
Examination	2	Preparation of report	-
		Preparation for examination	106

### **Subject belongs to:**

<i>Study Cycle</i>	<i>Study program</i>	<i>Subject type</i>
Third	Agronomy	Compulsory

**The aim of the course:** to provide knowledge of the latest achievements of biology of plant productivity and abilities to interpret the results of agronomic research, to model plant productivity and production quality; to identify morphogenetic, organogenetic, phenological and physiological parameters of plant ontogenesis associated with plant productivity.

**Prerequisites for entering the course:** Master's degree.

### **Links between the study programme outcomes, course outcomes, study methods and criteria and methods for learning achievement evaluation**

<i>Type of study programme outcomes</i>	<i>Course outcomes</i>	<i>Study methods</i>	<i>Criteria and methods for learning achievement evaluation</i>
Knowledge, its application	Most recent knowledge of agrobiological, which is able to apply for interpretation of agronomic research results developing new fundamental knowledge, ideas and technologies and solving tasks of strategic	<i>Lecture, given in a problematic, visualized teaching method, case study, discussion</i>	The great understanding of the main processes of plant biology and free use of the concepts
			The ability to operate with photosynthetic and ontogenetic parameters of various crops for interpreting

	activity.		agronomic phenomenon
			Taking into account agrobiological conditions to make an appropriate technological solution
Skills for research implementation	Is able to propose, analyze, organize and critically evaluate new ideas in search of original scientific solutions solving complex problems of agrobiology.	<i>Individual assignment, case study, brainstorming</i>	Ability to plan and execute applied research or projects
Special skills	Is able to evaluate agrobiological conditions of agricultural crop and to make an appropriate technological solution.	<i>Report</i>	Presentation of the report
Social skills	Is able to communicate with colleagues, the scientific community and the public.	<i>Individual assignment, brainstorming</i>	Ability to plan and execute applied research or projects.
Personal skills	Is able to excel and critically evaluate scientific information.	<i>Report</i>	Ability to plan and execute applied research or projects

### ***Content of the course:***

#### *Lectures:*

#### **1. Factors of plant productivity.**

- 1.1. A general knowledge about the plant yield.
- 1.2. Botanical peculiarities of agricultural plants.
- 1.3. Ontogenesis of agricultural plants.
- 1.4. The genetic determination of the productivity.
- 1.5. Plant resistance to biotic and abiotic factors.
- 1.6. Biology of the whole plant.
- 1.7. Physiology of plant production.
- 1.8. The plant yield, harvest index, modelling.

#### **2. Biological peculiarities of agricultural plants.**

- 2.1. Biology of vegetable production.
- 2.2. Biology of garden plants production.
- 2.3. Biology of Poaceae crop production.
- 2.4. Biology of Fabaceae crops production.
- 2.5. Biology of rape production.
- 2.6. Biology of sugar beet production.
- 2.7. Biology of potato production.

## 2.8. Biology of forage plants production.

**Learning methods:** explanatory-demonstration method – lecture, discussion, one minute reflection, group discussion, individual work. In lectures is overviewed theoretical material, highlighting key issues supporting with examples, is indicated sources of information related to the subject, is submitted questions for discussion. An individual task is related to the dissertation topic. Based on the knowledge, agrobiological principles and regularities, Ph D student reasons hypothesis, objectives and tasks of its scientific theme and make a public presentation of the group. At a minimum of the number of Ph D students instead of lectures consultation receives.

### **Methods and structure of the cumulative assessment of students' achievements**

Students' achievements are assessed in a 10-grade scale in the system of cumulative assessment. Assessment is carried out in accordance with the criteria for the assessment of the subject's study results.

#### **Structure of the cumulative grade:**

<i>Assessment type</i>	<i>Weighted score</i>	<i>Assessment deadline</i>
Control works	0,2	
Individual assignment	0,3	
Examination	0,5	According individual plan

#### **1. The main sources of learning:**

1. Šlapakauskas V., Duchovskis P. Augalų produktyvumas. LŽŪU, -2007. 253 p.
2. Šlapakauskas V. Augalų ekofiziologija. K.: Lututė, 2006. 430 p.
3. Wallace D.H. Plant Breeding and Whole-System Crop Physiology : improving crop maturity, adaptation and yield. New York: CAB,International. 1998. 390 p.
4. Fageria N.K., Baligar V.C., Clark R.B. Physiology of crop production. USA, Food Product Press. 2006:345.
5. Fitter A.H., Hay R. Environmental Physiology of plants. S.D., S.F., N.Y., B.,L.,S., T.Academic press. 2002. 367.
6. Hay R., Porter J. The physiology of crop yield. Blackwell publishing, UK,USA, Australia. 2006. 314.
7. Kuperman F.M. Morfofiziologija rastenii (Morfofiziologičeskij analiz etapov organogeneza različnyh žiznenich form pokritosemenich rastenii). M.: Viššaja škola, 1984. 240 s. (rusų k.).
8. Duchovskis P. 2004. Flowering initiation of wintering plants. Sodininkystė ir daržininkystė, 23 (2): 3-11.
9. Третьяков Н Н. Физиология и биохимия сельскохозяйственных растений. М.: Колос, 1998. 639 с.

#### **Additional learning resources:**

1. Bluzmanas ir kt. Augalų fiziologija. V.: Mokslas, 1991. 420 p.
2. Kopcewicz J., Lewak St. Podstawy fizjologii roslin. PWN, Warszawa, 1998, 725 s.
3. Lietuvos mokslų akademija / Žemės ūkio mokslai (periodinis mokslo žurnalas).
4. Lietuvos mokslų akademija / Biologija (periodinis mokslo žurnalas).
5. Lietuvos mokslų akademija / Ekologija (periodinis mokslo žurnalas).

6. Sodrininkystė ir daržininkystė (periodinis mokslo žurnalas).
7. Žemdirbystė-Agriculture (periodinis mokslo žurnalas).
8. Stašauskaitė S. Augalų vystymosi fiziologija.- Vilnius: Debesija, 1995.-98 p.
9. Taiz L., Zeiger E. Plant physiology.- California: The Benjamin Cumings publ. Company,- 2002. 690 P.

***Subject teachers:***

<b><i>Role of teacher</i></b>	<b><i>Academic title, scientific degree, name, surname</i></b>
<b><i>Coordinating teacher</i></b>	<b><i>Prof. habil. dr. Pavelas Duchovskis</i></b>
<b><i>Other teachers</i></b>	<b><i>Doc. dr. Ilona Vagusevičienė</i></b>

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***Approval at the Institute: 2019 04 17 protocol Nr***

***Approval at the meeting of the PhD programme committee: 201... .. protocol Nr.....***

***Course description valid until***