

## COURSE DESCRIPTION

Course code	Volume in ECTS credits	Institution	Faculty	Department
AGR8018	7	VMU AA	AF	BABI

### Course title in Lithuanian

Augalų fiziologija

### Course title in English

Plant Physiology

Study methods	Volume in ECTS credits
Lectures	1
Consultations	1
Seminars	1.5
Individual work	3.5

### Short course annotation in Lithuanian (up to 500 characters)

Kursas priklauso laisvai pasirenkamiesiems dalykams. Kurso metu nagrinėjama augalų fiziologinių procesų sąveika įvairiuose augalo lygmenyse kintančio klimato sąlygose, išplečiamos žinių ribos apie vykstančių procesų valdymo principus ir integravimo būdus. Tikslas – analizuoti įgytas teorines žinias augalų fiziologijos srityje ir jas interpretuoti sąsajose su tiriamuoju darbu. Studijų formos: paskaitos, seminarai, konsultacijos, baigiamasis egzaminas.

### Short course annotation in English (up to 500 characters)

The course is owned free optional studies. The course examines the interaction of plant physiological processes at various levels of plant conditions of climate change, expands the boundaries of knowledge about governance processes and integration methods. The aim - to analyze the acquired theoretical knowledge in the field of plant physiology and their interfaces to interpret the research work. Study forms: lectures, seminars, consultations, individual work and the final exam.

### Relevance of the course

After completing the course, students will have the knowledge about scientific achievements in the field of plant physiology, plant vital functions, their mechanisms and coordination at cellular, plant and population levels. Will be able to evaluate the interaction of plant processes with environmental and technological factors of cultivation. The knowledge gained will allow them to search for scientific solutions in the fields of agricultural science and professional activity, will significantly expand the knowledge about the principles of plant process management and integration methods.

### Course aims

The main course aim – to provide knowledge that will allow the interpretation of the fundamental processes at the level of knowledge and the latest scientific research results; to plan research and analyse, systematize data and evaluate plant processes, their interactions with the environment, anthropogenic and technological factors.

### Content (topics) and methods

1 topic. Biochemical and physiological processes in plants and their cells. Methods: literature analysis, discussion lecture.  
 2 topic. Plant Root Nutrition. Plant nutritional and symbiotic relationships. Methods: discussion, case analysis.  
 3 topic. Physiology of plant water metabolism. Methods: literature analysis, discussion lecture, case study.  
 4 topic. Physiology of carbon absorption and transformation. Effects of ecological (abiotic, biotic and anthropogenic) activities. Methods: literature analysis, consultation, discussion.  
 5 topic. Growth and development physiology. Physiology of stress and adaptation. Plant secondary metabolites (programs, regulation and self-regulation). Plant hormones and secondary metabolites of various stressors tolerance. Methods: literature analysis, discussion lecture, case

study, consultation, individual and collective work.

**Structure of cumulative score and value of its constituent parts**

Written work and presentation - 50% of the final grade, Exam - 50% of the final grade.

**Compulsory reference materials**

No.	Authors of publication, title, publishing house, year of publication.
1.	Bhatla S.C., Lae M.A. <i>Plant Physiology. Development and Metabolism</i> . Springer, 2018.
2.	Hemsley A.R., Poole I. <i>The evolution of plant physiology: from whole plants to ecosystems</i> . London: Elsevier Academic Press, 2004.
3.	Hopkins W.G., Hüner N.P.A. <i>Introduction to Plant physiology</i> . Hoboken (N.J.): J.Wiley&Sons, 2009.
4.	Nobel, Park S. <i>Physicochemical and Environmental plant physiology</i> . 4 <sup>th</sup> Edit. Academic Press, 2009.
5.	Öpik H., Rolfe St.A. <i>The physiology of flowering plants</i> . New York: Cambridge University Press, 2005.
6.	<i>Physiology and molecular biology of stress tolerance in plants</i> . Ed. by K.V.Madhava Rao, A.S.Padhavendra, K. Janardhan Reddy. Springer, 2006.
7.	Tainz L., Zeiger E. <i>Plant Physiology</i> . Sunderland (mass):Sinauer Associates, 2010.
8.	Tainz L., Zeiger E., Möller I.M., Murphy A. <i>Plant Physiology and development</i> . Oxford University Press, 2018.

**Supplementary reference materials**

No.	Authors of publication, title, publishing house, year of publication.
1.	<i>Brassinosteroids in Plant Development Biology an Stress Tolerance</i> . Ed. by J. Yu, G. Ahammed, P. Krishna. 2019.
2.	<i>Cell physiology Source Book: Essentials of Membrane Biophysics</i> . Ed. by N. Sperelakes. 4th edition, 2011.
3.	Fagaria N.K., Baligar V.C., Clark R.B. <i>Physiology of crop production</i> . New York etc: Food products press., 2006.
4.	Kacienė G. <i>Skirtingų veiksmų sukeltas oksidacinis stresas ir jo įtaka vasarinių miežių (Hordeum vulgare L.) atsparumui: daktaro disertacija</i> . Kaunas, VDU leidykla, 2014.
5.	Kutschera U. <i>Prinzipien der Pflanzenphysiologie</i> . 2. Auflage. Spektrum Akademischer Verlag, Heidelberg, Berlin, 2002.
6.	Schopfer P., Brennicke A. <i>Pflanzenphysiologie</i> . 6. Auflage. Elsevier, 2005.
6.	<i>Plant metabolism. Methods and Protocols</i> . Ed. by G.Sriram.Springer, 2014.
6.	Юрин. В.М. <i>Физиология растений</i> : учебное пособие для студентов высших учебных заведений по биологическим специальностям. 2010.

**Course programme designed by**

No.	Name, surname	Institution	Degree	E-mail address
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