

COURSE DESCRIPTION

Course code	Volume in ECTS credits	Institution	Faculty	Institute
AGR8004	7	VMU AA	AF	Biology and Plant Biotechnology

Course title in Lithuanian

Žemės ūkio augalų biotechnologija

Course title in English

Agricultural plants biotechnology

Study methods	Volume in ECTS credits
Lectures	2,0
Consultations	
Seminars	1,5
Individual work	3,5

Short course annotation in Lithuanian (up to 500 characters)

Perteikiamos bazinės ir naujausios žinios apie augalų biotechnologiją. Dalykas skirtas giliau suprasti augalų izoliuotų organų, audinių ir ląstelių auginimo savitumus *in vitro* sistemoje, didžiausią dėmesį skiriant naujausiems šio mokslo pasiekimams, žemės ūkio augalų biotechnologinių metodų panaudojimo praktikoje galimybėms bei jų reikšmei įvairių mokslų ir visuomenės vystymosi kontekste.

Short course annotation in English (up to 500 characters)

Basic and advanced knowledge on plant biotechnology are included. The subject intended for a deeper understanding peculiarity of isolated organs, tissues and cells in *in vitro* system. The greatest attention is paid on the most recent achievements in plant biotechnology, agricultural plant biotechnological methods used in practice and their implications for the various sciences and social development.

Relevance of the course

Creation of plant genetic diversity by traditional breeding methods is a long and difficult process based on intervarietal hybridization and selection of the best plants. The development of genetic diversity all around the world progressively increase applying of *in vitro* technologies with leads to create varieties not only with new characteristics (improved quality parameters, resistance to diseases, herbicides, etc.), but also to reduce the period of time required to develop genetically stable lines. The theoretical knowledge and practical skills of plant biotechnology are very relevant for the research in the field of agronomy using biotechnological methods.

Course aims

Provide students with knowledge about the latest achievements in agricultural plant biotechnology, about importance of isolated organs, tissues and cell cultures in today's crop production and peculiarity in employment of biotechnological methods for breeding programs of different plant species in order to increase the efficiency of breeding work.

Content (topics) and methods

A plant biotechnology methods, directions and tasks. Conditions, principles and application possibilities of the higher plants isolated organs, tissues and cells cultures. Methods of micropropagation *in vitro*. Commercial aspects of micropropagation. *In vitro* technology in plant breeding. Creation of haploids and homozygous lines. Development of polyploid and mutants. Cell breeding. The secondary metabolic compounds *in vitro*. Storage of genetic plasma *in vitro*. Gene engineering. Genetically modified plants. GMO risk assessment and legislation.

Methods.

Explanatory - demonstration method, discussion, self-learning using additional material, individual presentation of the assignment. If doctoral students studying the subject are less than three, lectures are not delivered. In this case, the doctoral students, in consultation with teachers, self-studying the latest scientific literature and prepared an individual assignment in the doctoral dissertation topic. Consultation arranged in accordance with a pre-arranged schedule.

Structure of cumulative score and value of its constituent parts

Individual work – 20 %, seminars – 30 %, exam – 50% of final knowledge assessment

Compulsory reference materials

No.	Authors of publication, title, publishing house, year of publication.
1.	Chrispeels M. J., Sadava D. E. <i>Plants, genes and crop biotechnology</i> . Jones and Bartlett Publisher, 2002, 562 p.
2.	Christou P. <i>Handbook of Plant Biotechnology</i> . Wiley, 2004, 1488 p.
3.	Coleman J., Evans D., Kearns A. <i>Plant cell culture</i> . Garland science, 2003, 208 p.
4.	Plant biotechnology and agriculture [elektroninis išteklis]: prospects for the 21st century / edited by A. Altman, P. M. Hasegawa. Amsterdam; Boston: Academic Press, 2012, 586 p.
5.	Plant mutation breeding and biotechnology / edited by Q. Y. Shu, B. P. Forster, H. Nakagawa. Wallingford, Oxfordshire ; Cambridge, Mass. : CABI, 2012, 608 p.
6.	Transgenic crops IV / edited by E. C. Pua, M. R. Davey. Berlin : Springer, 2007. 476 p.
7.	From plant genomics to plant biotechnology / edited by P. Poltronieri, N. Burbulis, C. Fogher. Cambridge : Woodhead Publishing Limited, 2013, 242 p.
8.	Ratledge C., Kristiansen B. <i>Basic biotechnology</i> . Cambridge University Press, 2006, 666 p. Slater A., Scott N. W., Fowler M. R. <i>Plant biotechnology. The genetic manipulation of plants</i> . Oxford university Press, 2004, 346 p.
9.	Trigiano R. N., Gray D. J. <i>Plant development and biotechnology</i> . CRC Press, 2005, 359 p.

Supplementary reference materials

No.	Authors of publication, title, publishing house, year of publication.
1.	Atherton K. <i>Genetically modified crops</i> . Taylor & Francis Ltd, 2002, 272 p.
2.	Cassells A. C., Gahan P. B. <i>Dictionary of plant tissue culture</i> . An Imprint of The Haworth Press, 2006, 265 p.

Course programme designed by

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