COURSE DESCRIPTION

Course code	Volume in ECTS credits	Institution	Faculty	Department
AGR8019	7	VMU	Agronomy	Biology and plant biotechnology

Course title in Lithuanian

Mikrobiologija

Course title in English

Microbiology

Study methods	Volume in ECTS credits
Lectures	2
Consultations	2
Seminars	-
Individual work	3

Short course annotation in Lithuanian (up to 500 characters)

Nagrinėjama mikroorganizmų morfologija, fiziologija, aplinkos veiksnių poveikis mikroorganizmams, mikroorganizmų reikšmė žemės ūkyje ir biotechnologijoje. Išnagrinėjamas mikroorganizmų paplitimas aplinkoje, naudingų ir patogeninių mikroorganizmų savybės. Analizuojamai mikrobiologiniai procesai dirvožemyje, maisto žaliavose, kenksmingi mikroorganizmai, jų patekimo šaltiniai ir būdai, mokoma taikyti mikrobiologinius tyrimo metodus, įvertinti mikrobiologinę taršą, taikyti profilaktines priemones.

Short course annotation in English (up to 500 characters)

Morphology, physiology of microorganisms, impact of environmental factors on microorganisms, significance of microorganisms in agriculture and biotechnology are considered. The prevalence of microorganisms in the environment, the properties of useful and pathogenic microorganisms arestudied. Microbiological processes in soil, food raw materials, harmful microorganisms, sources and methods of their investigation are analyzed. Microbiological research methods, microbiological contamination and preventive measures application are acquired.

Relevance of the course

PhD students will focus on the biological properties of microorganisms and the peculiarities of their development, the importance on harvest quality. Ater finishing the course students will be able to analyze, independently solve microbiological phenomena problems. They will acquire skills to plan and carry out fundamental and applied research of microorganisms. Students will know the application of various factors and methods to control of microorganisms in agriculture.

Course aims

To develop the doctoral student's knowledge and abilities, ensuring his/her competences for knowledge and research of microorganisms in practical work, the clarification of microbiological problems, solving problems reflecting society's needs, planning, conducting research, and adopting innovative solutions.

Content (topics) and methods

Lectures/discussions:

1. Group of microorganisms, and others microbiological obejcts - eukariotc and prokaryotic microbes, viruses, prions
2. Morphological and physiological features of microorganisms - prokaryotes and eukaryotes
3. Bacteria and Archaea: general characters, classification. Morphology, ultra structure and chemical composition
4. Fungi: general characters, classification. Morphology, ultra structure and chemical composition of moulds and yeasts
5. Viruses and prions: structure, replication, nomenclature and classification
6. Environmental factors influencing the growth and survival of microorganisms
7. Sources of carbon, nitrogen and some other chemical elements used by microbes. Factors of

microbial growth 8. Microbial metabolism - fermentation and application in biotechnology 9. Microbial metabolism - respiration and application in biotechnology 10. Soil microbiology. The role of microorganisms in the formation of soil and humus 11. Raw plant material microbiology. Practical training: 1. Investigation of physical control measures for growth of microorganisms 2. Investigation of chemical control measures for growth of microorganisms 3. Identification of microorganisms using selective and chromogenic media 4. Microbiological evaluation of soil samples.

Structure of cumulative score and value of its constituent parts

Practical training - 0,5%; Exam 0,5%.

Compulsory reference materials

No.	Authors of publication, title, publishing house, year of publication.
1.	Cappuccino, J. Microbiology: a laboratory manual, 2008
2.	Madigan M. Brock. Biology of microorganisms. Pearson Prentice Hall, 2012
3.	Modern soil microbiology (edited by Elsas D. Et al.) CRC press, 2007
4.	Pranaitis P. Mikrobiologijos pagrindai. Kaunas, 2009

Supplementary reference materials

No.	Authors of publication, title, publishing house, year of publication.
1.	Glazer, A. N. Microbial biotechnology :fundamentals of applied microbiology /Alexander N. Glazer, Hiroshi Nikaido. New York, N.Y. : Cambridge University Press, 2007
2.	Principles and applications of soil microbiology /edited by David M. Sylvia et al. Upper Saddle River, N.J. : Pearson Prentice Hall, 2005
3.	Tortora, G. J. Microbiology /by Gerard J. Tortora, Berdell R. Funke, Christine L. Case.Boston : Pearson, 2013.

Course programme designed by

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