Course Unit Descriptor

Study Programme: Biotechnology

Course Unit Title: Microbiological control of bioprocesses

Course Unit Code: BO401

Name of Lecturer(s): Assoc. Prof. Dragoljub Cvetković, PhD; Ass. Prof. Aleksandra Ranitović, PhD

Type and Level of Studies: Undergraduate academic studies

Course Status (compulsory/elective): Compulsory

Semester (winter/summer): Winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 6

Prerequisites: Microbiology

Course Aims:

Acquisition of basic scientific and academic knowledge and skills in the field of microbiological control of the processes and products in biotechnology, with the understanding of HACCP principles and respective standards for this type of industry.

Learning Outcomes:

Students are trained to understand theoretical and practical principles of microbiological control of bioprocesses, ecological and physiological characteristics of microorganisms important for technological microbiology, understanding of role and significance of microorganisms of water, production of sterile products, antimicrobial agents, hygiene and disinfection, understanding of biofilm and HACCP principles.

Syllabus:

Theory

Microorganisms important for bioprocesses. Pathogens and their indicators and product spoilage microorganisms. Sources of contamination of products - raw materials, water, air, equipment. Legislation. Biotic and abiotic factors. Sterilization and aseptic production. Important Gram-positive and Gram-negative bacteria, fungi, yeasts and protozoa. Bacterial resistance to antibiotics. Water microbiology. Biofilms. Hygiene of equipment, air and people. Cleaning and disinfection - implementation and monitoring of sanitation, cleaning and disinfection in biotechnology. Relevant ISO standars and HACCP.

Practice

Experimental exercises in preparation culture media for certain groups of microorganisms, microbiological testing of products, as well as samples from the production environment and water, effects of physical, physico-chemical and chemical factors , as well as biotic factors on microorganisms, procedures for monitoring of biofilms, methods for quality testing of disinfectants, implementation of HACCP.

Required Reading:

1. C. Shen, Y. Zhang (2017): Food microbiology Laboratory for the Food Science Student, A Practical Approach, Springer International Publishing, Switzerland.

2. C. Bell, P. Neaves, A.P.Williams: Food microbiology and Laboratory Practise, Blackwell, 2005.

3. J.M. Jay, M.J.Loessner, D.A. Golden:Modern Food Microbiology, Springer, 2005.

4. D. Mara, N.Horan: Water and Wastewater Microbiology, Academic Press, San Diego, 2003.

Weekly Contact Hours: 5	**Lectures:** 2	**Practical work:** 3

Teaching Methods:

Lectures and students group work

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation	-	written exam	-
Practical work	18	oral exam	30
Preliminary exam(s)	40	…….	
Seminar(s)	12		

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.