

STUDY PROGRAMME	CHEMICAL ANALYSIS, 653F18001
SUBJECT TITLE	Microbiology
NUMBER OF CREDITS	3
DURATION OF SUBJECT	Total: 80 hours (48 contact hours, 32 self-study hours)
TEACHING PERIOD	Autumn Semester
SUBJECT CONTENT	<p>Subject objective Develop the microbiology knowledge system and skills necessary to work with microorganisms.</p> <p>Learning outcomes Be able to: carry out microbiological tests independently and in collaboration with colleagues; explain and summarise test results independently; explain the importance of microorganisms for biotechnological processes; explain the basic concepts of microbiology and characterise microorganism grouping principles; describe the most important characteristics of the structure and physiology of microorganisms; describe the effect of fundamental environmental factors on microorganisms; explain the key metabolic processes occurring in cells of microorganisms; use standard equipment for the cultivation and analysis of microorganisms; apply methods to determine the number of microorganisms; work with a light microscope, use a variety of microscopy methods; apply microorganism cultivation techniques, media preparation, media and work equipment sterilisation methods in practice; work with pure microorganism cultures under aseptic conditions; define the principles of sterilisation and disinfection; prepare and analyse microorganism samples; cultivate microorganisms; describe methods of microorganism conservation and storage.</p> <p>Content (topics)</p> <ol style="list-style-type: none"> 1. The object, aims and objectives of microbiology, historical development. Links of the microbiology science with other bio-sciences (biochemistry, genetics, molecular biology) 2. Structure of the cell: prokaryote and eukaryote cells. Bacterial morphology 3. Diversity and characteristics of archaea. Viruses, structure, classification, reproductive cycle 4. Systematic review of microorganisms, classification principles. Bacterial nomenclature 5. Microorganism testing methods. Basics of microscopy 6. Microorganism nutrition, distribution by the energy source, electron donor and carbon source. How do substances gain access to the microorganism cell? 7. The effect of environmental factors on microorganisms 8. The metabolism of microorganisms. Catabolic and anabolic reactions 9. The culture medium of microorganisms and their preparation 10. Cultivation of microorganisms, growth curve description 11. Quantification methods of micro-organisms and their biomass. Centrifugation 12. Sterilization, the main methods. Disinfection, physical and chemical disinfectants 13. Microorganism preservation and storage techniques. Collections of microorganisms
ASSESSMENT	Cumulative assessment (intermediate settlements, laboratory work, self-study, examination)

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