STUDY PROGRAMME	**CHEMICAL ANALYSIS, 653F18001**
SUBJECT TITLE	**Biotechnology**
NUMBER OF CREDITS	3
DURATION OF SUBJECT	Total: 80 hours (48 contact hours, 32 self-study hours)
TEACHING PERIOD	Spring Semester
SUBJECT CONTENT	**Subject objective** Provide students with the knowledge of biotechnology science and application of its methods in various spheres of activity, the use of microorganisms in heterologous protein synthesis, technological aspects of gene engineering and protein synthesis. **Learning outcomes** Be able to: express ideas responsibly, critically and consistently, raise problems and solve; work independently and carefully, plan and organise independent activities; define basic concepts of biotechnology; use the proper biochemistry terminology; describe the concept of eukaryotic and prokaryotic cell gene and regulatory features of gene expression; choose the right system for heterologous protein expression; demonstrate the use of prokaryotic cells in recombinant protein synthesis; describe the role of prokaryotic cells in industrial biotechnology; define practical aspects of gene engineering and protein expression; prepare samples of life nature objects and their components for practical purposes; choose the right sample and sample preparation method for life nature objects and their components; describe the use of eukaryotic cells and mammalian cells in industrial biotechnology; summarise antibody synthesis technology using hybridoma cells. **Content (topics)** 1. Biotechnology: trends and objectives. 2. Prokaryotic cell gene regulation (structure of prokaryotic gene – basic elements, from DNA to the final product). 3. Eukaryotic cell gene regulation (structure of eukaryotic gene – basic elements, from DNA to the final product). 4. The use of prokaryotic cells in recombinant protein synthesis. Application of gene regulation principles for protein expression. Main vectors, strains and cloning methods (PCR reaction). 5. Industrial production methods of prokaryotic cells and industrial biosynthesis. 6. Transformation of E. coli cells, recombinant protein synthesis while growing cells in flasks. 7. Fractionation of proteins in denaturing conditions (sample preparation, electrophoresis, gel development and scanning). 8. Protein expression in yeast. Use of S.cereivisae ir P. Pastoris yeast for protein synthesis. 9. The use of mammalian cells in protein synthesis. Industrial cultivation of mammalian cells. 10. Hibridoma cells: application in antibody production, ways of cultivation..
ASSESSMENT	Cumulative assessment (intermediate settlements, laboratory work, self-study, examination)

SUBJECT COORDINATOR	Asta Jokubauskaitė Vilniaus kolegija/University of Applied Sciences, Faculty of Agrotechnologies, Chemistry Department 2A Beržų str., Buivydiškės, Vilnius district, LT–14160, Lithuania Tel. +370 5 2 19 16 59 E-mail: chemija@atf.viko.lt