

Dr Eng. Joanna Jeżewska-Frąckowiak, dr Joanna Żebrowska Forms of classes, the realization and number of hours ECTS credits 3 A. Forms of classes, in accordance with the UG Rector's regulations classes - 60 h lecture, laboratory classes tutorial classes - 5 h B. The realization of activities student's own work - 10 h m.class learning Total: 75 h - 3 ECTS C. Number of hours Total: 75 h - 3 ECTS 60 h (15 h lecture, 45 h laboratory classes) Total: 75 h - 3 ECTS The academic cycle 2021/22 summer semester Type of course Language of instruction obligatory Polish Form and method of assessment and basic criteria for evaluation o examination requirements Experimental design A. Final evaluation, in accordance with the UG study regulations	processes in the chemical indust	lry				
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 Presenting the topics given in lecture course contents.
 Presenting classical and molecular biotechnology processes in the chemical industry and molecular biotechnology applications perspective.



Course contents

A. Lecture topics:

Biotechnology process definitions and elements. Biotechnological process design for the purpouse of chemical industry. Conventional and genetically modified organisms and their industrial applications. Native and recombinant enzymes sources for different branches of industry.

Characteristics of the chosen biotechnological processes in the chemical, pharmaceutical and plant protection products industry. Biotechnological processes in the waste management. Plants as bioreactors in the pharmacy. GMO, GMM main legal regulations in the biotechnological processes of the chemical industry.

B. Laboratory topics:

Biotechnological process of rennet cheese production. Microbiological composition of samples collected from the subsequent stages of the process. Biotechnological processes in the wastewater treatment.

Bibliography of literature

A. Literature required to pass the course

Klimiuk E., Łebkowska M.: Biotechnologia w ochronie środowiska, PWN, 2005 Glick, B.R., Pasternak, J.J., Patten, C.L.: Molecular biotechnology: Principles and applications of recombinant DNA. ASM PRESS, 2009

B. Extracurricular readings

Libudzisz Z., Kowal K., Żakowska Z.: Mikrobiologia techniczna, tom 2, PWN 2008 Olańczuk-Neyman K.: Laboratorium z biologii środowiska, Wyd. PG, 1998

Knowledge

- 1. Student knows the definitions of biotechnological process and its design principles, as well as biotechnological processes in different branches of the chemical, pharmaceutical and plant protection products industry.
- 2. Student knows conventional and genetically modified organisms applied in the chemical industry.
- 3. Student describes the mechanisms of wastewater treatment as well as waste neutralization biotechnological methods
- 4. Students knows basic principles of recruiting conventional and recombinant enzymes for industrial purposes.
- 5. Student knows possibilities of genetically modified organisms applications in differents branches of chemical industry, as well as GMO, GMM main legal regulations and detection methodology.

Skills

- 1. Student is able to plan tasks of the experiment in the biotechnological laboratory, applying GLP and safety rules.
- 2. Student plans biotechnological process of obtaining the product, involving usage of microorganisms and enzymes.
- 3. Student microbiologically characterizes samples, collected from the different stages of biotechnological process.
- 4. Student prepares written report of the performer laboratory work.
- 5. Student prepares written report with documentation in a form of abstract and graphical abstract.

Social competence

- 1. Student understands need of further education.
- 2. Student carefully i criticically expresses own opinions, bears in mind and values possibilities offered by modern biotechnology.
- 3. Student realizes the spectrum of possible biotechnological methods applications in the chemical industry.

4. Student plans and performs given tasks working independently and in team, is able to manage time and equipment. Prepares the schedule of tasks.