BIOTECHNOLOGY

2 ECTS

AGH University of Science and Technology

Course responsible: Dr. Grzegorz S. Jodłowski

Course overview

The aim of the subject is to acquire a fundamental knowledge on the biotechnology issues with special stress on the application of biotechnology in fuel processing and production or environmental protection. Students are introduced to the biochemistry and microbiology. They obtain the basic knowledge on bioreactors, fermenters and other equipment used in bioprocessing. The course is built of two parts: lecture and seminar. During seminar students have to prepare a presentation on selected subjects. Lectures content: Introduction to biotechnology; historical background, applications, biotechnology in power production and environmental protection. The methods of development of a biotechnology process e.g. modernization, innovation, investigation, implementation, and optimization. Screening and improvement of bioprocess, metabolism and metabolites, industrial microorganisms biocatalysts and enzymes also will be considered. The terms of bioprocess: carrying; bioreactors, strains of microorganisms and raw material choice.. Septic safeties are other subjects to be discussed. Selected bioprocesses in energy sector.

Seminars: Fundamentals of biotechnology. The preparation of biomaterials (half-products): alcohols, polymers etc., energy media production (e.g. methane, methanol), Biomaterials conversion for energy production (e.g. MTBE bioethanol, alga-fuel and biomass-hydrogen systems). Biotechnology in environmental protection: wastewater treatment; bio-filters, active sludge, wastes bio-utilization, biosynthesis, basics of bio-catalysis, biogas production issues, GMO issues and bio-indicators.

Outcome of the course

After this course the student should have the knowledge of the following subjects:

- overall nomenclature and classification of living organisms;
- fundamentals of cell structure and functions;
- DNA, RNA and chosen nucleotides – structure and function;
- fundamentals of genetics and genomics;
- metabolism and metabolites – how it works;
- basics of Krebs and Calvin cycles;
- processes of respiration, aerobic and anaerobic fermentation;
- chosen applications of bioprocesses (use of different starting materials problems, microorganisms, technological regimes, after treatment): alcohol fermentation, biogas

production, lactic acid fabrication, antibiotics and vaccines production, bioremediation, waste water treatment; rules of the bioprocess optimization.

Course coordinator & teachers

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