

Course title: **Concept of biorefinery and platform chemicals** – selectable course (spring/winter)

Number of contact hours: 15 hours seminars

ETCS credits: 2

Course description: The seminar presents the idea of the biorefinery and current strategies in the integrated production of energy and chemicals from biomass. The topic is highlighted on the examples of fatty-acid and lignocellulose materials processing. The idea of chemical platform will be discussed on selected examples of C3-C6 components, which by chemical or biochemical transformations can be converted to valuable intermediates. As a result of the course the student should be able to identify the trends and perspectives in the chemical market based on biomass, and also know the basics of so called "balanced biomass economy". Information about the most important platform chemicals: glycerol, 3-hydroxypropionic acid, aspartic, fumaric, succinic and malic acids, 3-hydroxybutyrolactone, xylitol, glutamic, itaconic, levulinic, glutaric acids, 2,5-furan-di-carboxylic acid and sorbitol. Explanation of their most important physicochemical properties and sources.

Education effects:

- knowledge: student knows the most important types of platform chemicals; knows the methods of their conversion to valuable chemicals in the light of biorefinery concept
- skills: student knows how to search for up-to-date information about the current achievements in the bio-based-technologies; can prepare the report and presentation on selected topic in this field
- social: student is able to work independently on selected topic; is aware of continual progress in the field of bio-based-technologies and understand the need of further development in this field; can prepare and present in front of group the results of his literature investigation on selected topic.

Literature: [1] H.R.Ghatak — Biorefineries from the perspective of sustainability: Feedstocks, products, and processes, *RenewSusEnergy Rev.* 15 (2011) 4042
[2] Ayhan Demirbas — *Biorefineries For Biomass Upgrading Facilities*, Springer, 2010, Springer
[3] Francesco Cherubini — The biorefinery concept: Using biomass instead of oil for producing energy and chemicals, *Science Direct*, 2010, *Energy Conv. & Management* 51 (2010) 1412.

Assessment method: Final test, presentation of selected topic

Prerequisites: Basic knowledge in organic chemistry and technology

Primary target group: All specialties students

Lecturer: dr hab. inż. E.Skrzyńska

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