

Course title: **Circular economy and the power of bio-waste cycle**

Institute/Division: **FACULTY OF CHEMICAL ENGINEERING AND TECHNOLOGY**

Erasmus subject code:

Number of contact hours: 30 hours (15h – seminar, 15 h laboratory)

Course duration: 1 semester (winter)

ETCS credits: **2**

Course description: **Lectures content:** Circular economy-definition, description, rules barriers and legislations./ Comparison of circular and linear systems./ Business models characteristic and examples: REgenerate, Share, Optimise, Loop, Virtualise, Exchange. /Case- studies of Industrial symbiosis. / Eco-cities (Masdar, Toronto, Singapore)- examples and comparison/ Circular raw-materials/ Closed Loop recycling of the high-added-value materials in the secondary circle of materials flow, in order to decrease the demand of primary raw materials./ Turning waste into value, end of waste criteria, waste to energy/ Case studies of circular products, biological waste streams, waste streams from different industries

Laboratory content: Organo-mineral fertilizers based on waste biomass (L1), Waste as a secondary raw materials (L2,3)

.Literature: [1] Ken Webster — The Circular Economy: A Wealth of Flows - 2nd Edition,, 2017

[2] <https://ellenmacarthurfoundation.org>

[3] https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en

Assessment method: Average from Final test or students projects (depending on group size), presence on lectures and delivered reports from each performed exercise

Prerequisites: Basic knowledge on technology and basic experience in the laboratory

Primary target group: Chemical technology/engineering students

Lecturer: dr hab. inż. K.Gorazda prof PK

Contact person: dr hab. inż. K.Gorazda, e-mail: katarzyna.gorazda@pk.edu.pl

Deadline for application: 15th of January

Remarks: The course runs regularly