

**Course title:** **Chemical Technology II**

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

**Erasmus subject code:** WITCh ICHIP oIIS B2

**Number of contact hours:** 45 hours (three blocks per 15h - lectures)

**Course duration:** 1 semester (spring)

**ETCS credits:** **3**

**Course description:** **Lectures content:** overview of the global market of polymers and plastics. Methods of polymerization: addition polymerization, condensation polymerization and modification methods. Addition polymer technologies: poly(ethylene), poly(styrene) and poly(vinylchloride) - chosen technologies, problems and solutions. Condensation polymers: epoxy resins, silicones and polyamides/Eco-friendly and sustainable technologies: poly(urethanes), epoxy resins and natural fillers. Modified natural polymers: modified cellulose and chitosan. Recycling of polymers: challenges and solutions (examples)/ Anionic surfactants synthesis and manufacture. Nonionic surfactants- synthesis and manufacture. Cationic surfactants - synthesis and manufacture/ Zwitterionic and amphoteric surfactants - synthesis and manufacture. Colloid systems and interfaces. Renewable raw materials/ Selected oxidation, halogenation, hydration, dehydration and esterification processes/Inorganic fertilizers production technologies and rules for its application: Characteristic of soil environment, functions and division of selected nutrients, fertilizers classification, production technologies of nitrogen and phosphoric fertilizers, one- and two-component fertilizers, characteristic of multi-component fertilizers, mixed and complex fertilizers, characteristic and problems of the fertilizers market, new solutions at raw materials/ Sodium phosphates production technologies and its application./ Advantages and disadvantages of basic inorganic technologies-sustainable development: definition of sustainable development, analysis and assessment of technological processes, advantages and disadvantages of basic inorganic technologies and directions of its development/ Industrial waste streams and waste management techniques: definition and classification of waste, waste management rules, waste quality and quantity, characteristics according to group distribution, effective ways for reducing and preventing waste production

**Literature:** [1 ] Martin B. Hocking — Handbook of Chemical Technology and Pollution Control (3rd Ed.), 2005,Elsevier; [2 ] Wan Wazer Phosphorus and its Compounds — Phosphorus and its Compounds, London, 1958, Interscience publishers; [3 ] Salah M. El-Haggar — Sustainable Industrial Design and Waste Management,, , 2007, Elsevier Ltd

**Assessment method:** **Final tests (average grade from three sub-sections presented at the lectures), presence on lectures**

**Prerequisites:** **Basic knowledge on general, inorganic and organic chemistry**

**Primary target group:** **Chemical technology/engineering students**

**Lecturer:** dr inż. K.Gorazda, dr inż. M.Miastkowska

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

**Deadline for application:** **15<sup>th</sup> of January**

**Remarks:** **The course runs regularly**