

Course title: **Basic concepts in chemistry of metal-based therapeutic agents**– selectable course

Institute/Division: **FACULTY OF CHEMICAL ENGINEERING AND TECHNOLOGY** / Engineering of Technological Processes

Erasmus subject code: WITCh ICHIP oIIS B5

Number of contact hours: 15 hours (15h seminary)

Course duration: 1 semester (spring)

ETCS credits: 1

Course description: **Seminary content:** Basic concepts in coordination chemistry, Lewis theory of acids and bases, molecular orbital theory / Ligand field theory, Crystal field theory, common coordination modes (octahedral, tetrahedral, square planar), electronic configuration of low-spin and high-spin complexes, Jahn-Teller effect, magnetic susceptibility / Ground and excited states of transition metal complexes, Jablonski diagram, spin-orbit coupling, heavy ion effect, photodynamic effect. / Spectroscopy of transition metal complexes: Electronic absorption spectra, origin of charge transfer (MLCT, LMCT) and d-d* transitions, UV selection rules, fluorescence emission spectra, typical IR and NMR spectra. / Essential and trace metals in biological systems, trace metals essential for humans health. / Discovery of cisplatin and its relevance to the therapy of cancer / Structure-activity relationship of transition metal complexes, chosen aspects of antimicrobial and antifungal activity of metal-based agents / Role of metal-based agents in photodynamic therapy of cancer and photodynamic deactivation of microbes. / Metal-based antioxidants, examples of superoxide dismutase (SOD) and catalase (CAT) mimetics / Recent progress in development of metal-based therapeutic agents, miscellaneous aspects of the activity of metal-based agents, role of the ligand.

Literature: [1] K. M. Mackay, R. A. Mackay — Introduction to Modern Inorganic Chemistry, 4th edition, London, 1989,
[2] F. A. Cotton, G. Wilkinson, C. A. Murillo, M. Bochmann — Advanced Inorganic Chemistry, 6th edition, New York, 1999,
[3] D. D. Ebbing, S. D. Gammon — General Chemistry, 7th edition, Boston, 2002, Houghton Mifflin Company

Assessment method: **Final test and presentation**

Prerequisites: **Good background in inorganic chemistry**

Primary target group: **all students**

Lecturer: dr inż. Dariusz Karcz,

Contact person: dr inż. Dariusz Karcz, e-mail: dariuszkarcz@chemia.pk.edu.pl

Deadline for application: **15th of January for students applying for spring semester,**

Remarks: **The course will start for at least 3-5 foreign students**