

Study program: PHARMACY			
Type and level of studies: Integrated academic studies			
Course unit: Bioinorganic chemistry			
Teacher in charge: dr Gordana P. Radić, associate professor			
Language of instruction : ENGLISH			
ECTS: 7			
Prerequisites: Completed courses of General and inorganic chemistry, Organic chemistry 1 and Organic chemistry 2			
Semester: WINTER SEMESTER			
Course unit objective : Acquiring knowledge and skills of synthesis, characterization and usage of transition metal complexes in medicine.			
Learning outcomes of Course unit:			
<ul style="list-style-type: none"> • Knowledge about a role of essential metals, importance of transition metal complexes and their usage in medicine. • Knowledge about some physico-chemical methods for characterization of obtained compounds (UV-Vis, IR, ¹H and ¹³C NMR spectroscopy); • Knowledge about redox reactions; Isomerism of complexes; Symmetry of complexes; Substitution reactions 			
Course unit contents			
<i>Theoretical classes</i>			
<i>Introduction to bioinorganic chemistry; complexes; central metal ions and ligands of complexes; dissociation of complexes, coordination number; Chemical bonds and symmetry of complexes; isomerism of complexes; nomenclature of coordination complexes; transition metal complexes with σ, π and δ bonds, transition metal complexes with unsaturated hydrocarbons; electronic spectra of transition metal complexes; acidity and basicity of transition metal complexes; substitution reactions of ligands in transition metal complexes; complexes of platinum and the similar metals; complexes of Au-ion and Bi-ion; complexes of Ag, Sb, V, Cr, Mn, Gd and Sn; complexes of Fe and Co; Other biomolecules as potential ligands.</i>			
<i>Practical classes</i>			
<i>Introduction to a experimental work; Synthesis of transition metal complexes; Characterization of transition metal complexes using physico-chemical methods (UV-Vis, IR, ¹H and ¹³C NMR spectroscopy); Investigation of reactions between platinum(II)-complexes and N-donor biomolecules using UV-VIS spectrophotometry; Investigation of reactions between platinum(II)-complexes and S-donor biomolecules using UV-VIS spectrophotometry; Reaction of oxidation of platinum(II)-complexes to platinum(IV) complexes; Investigation of reaction between potassium-tetrachloroplatinate(II) with dimethyl-sulfoxide (DMSO) using ¹H NMR spectroscopy; Isomerism of transition metal complexes; Synthesis of copper(II)-complexes; Synthesis of iron complexes; Synthesis, application and oxidation of cobalt-complexes; Crystallization of transition metal complexes; Investigation of kinetics of the enzyme reactions.</i>			
Literature			
<ul style="list-style-type: none"> • Nogrady T. Medicinal Chemistry: A Biochemical Approach. Oxford: Oxford University Press; 1988. • Rowe RC. Handbook of Pharmaceutical Excipients. London: Pharmaceutical Press; 2003. • Lippert B. Cisplatin, chemistry and biochemistry of leading antitumor drugs. Zurich: Wiley-VCH; 1999. • R.T. Door. Platinum and Other Metal Coordination Compounds in Cancer Chemotherapy. Edited by H.M. Pinedo and J.H. Schornagel. New York: Plenum; 1996. 			
Number of active teaching hours			Other classes
Lectures: 45	Practice: 30	Other forms of classes: Independent work: 150	
Teaching methods: Lectures, practice			
Examination methods (maximum 100 points)			
Exam prerequisites	No. of points:	Final exam	No. of points:
Student's activity during lectures	30	oral examination	70
practical classes/tests		written examination	
Seminars/homework		
Project			
Other			

Grading system		
Grade	No. of points	Description
10	91-100	Excellent
9	81 – 91	Exceptionally good
8	71 – 81	Very good
7	61 – 71	Good
6	51 – 61	Passing
5	< 51	Failing

(Table 5.2) Course unit description