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| **Study program:** Master studies Chemistry |
| **Course title:** Analysis of toxic substances (H220C) |
| **Name of lecturer/lecturers:** Aleksandra N. Pavlović |
| **Type of course:** elective |
| **Number of ECTS allocated:** 6 |
| **Course objectives**The goal of the course is to expand theoretical and practical knowledge about toxic substances, as well as the application of instrumental methods of toxic substance analysis. |
| **Course outcomes**After successful completion of this course, the student is able to:- explain the influence of different factors on the toxicity of inorganic and organic substances,- apply the acquired knowledge during the qualitative and quantitative analysis of various toxic substances,- recognize the applicability of instrumental methods of analysis in specific cases of analysis of toxic substances,- accurately and precisely analyzes and interprets the experimental results obtained by applying the appropriateinstrumental techniques. |
| **SYLLABUS***Lectures*oxicology and its branches. Relationship between dose and toxic effect. Definition of MRL, ADI, LOEL, NOAEL, LOAEL, LOEC, LC, LD, NOAEC, MOS, MDK, MDDD. Toxic and lethal doses. Methods of determining LD50. Acute and chronic toxicity. Phases of analysis of toxic substances: sampling, transportation and storage of samples, preparation of samples, analysis and interpretation of results. Analytical methods - choice of method. Classical methods of analysis. Instrumental methods of analysis. Tests to prove poison. Analysis of metals (Pb, Hg, As, Cd, Sb, Al, Ni, Cu, Bi, Be, Ba, Mn, Tl, Zn, Fe, Cr, Se Te, Pd). Analysis of non-metal compounds (NO2-, NO3-, SO42-, CN-, F-, Cl-, PO43-). Analysis of gases (CO, CO2, SO2, SO3, NO2, NH3, H2S, CS2, Cl2, F2, phosphine). Analysis of organic toxic substances.*Laboratory work*Determination of hydrogen chloride in air by acidimetry. Determination of hydrogen sulfide in the air using the iodosulfate method. Determination of carbon dioxide in air by titration with oxalic acid. Colorimetric determination of nitrates and nitrites in water. Fuchsin-formaldehyde method for determination of sulfur dioxide in air. Spectrophotometric determination of Cr(VI) ions in water. Determination of metals in wastewater using the ICP OES method. |
| **References**1. F. Plavšić, I. Žuntar, Uvod u analitičku toksikologiju, Školska knjiga, Zagreb, 2006. 2. M. Taštelan-Macan, Kemijska analiza u sustavu kvalitete, Školska knjiga, Zagreb, 2003. 3. M. Radivojević, V. N. Bashkin, Practical Environmental Analysis, Royal Society of Chemistry, Cambridge, 1999.4. R. Kastori, Teški metali u životnoj sredini, Naučni institut za ratarstvo i povrtarstvo, Novi Sad, 1997. 5. R. A. Flanagan, S. S. Braithwaite, B. Brown, F. A. de Wolff Widdop, Basic Analytical Toxicology, World Health Organization, Geneva, 1995. |
| **Active teaching classes** | **Lectures 45** | **Laboratory work 15** |
| **Teaching mode:** lectures, interactive classes, laboratory exercises, consultations |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** |
| **Pre exam duties** | **Points** | **Final exam**  | **Points** |
| Activity during lectures | 5 | Written examination |  |
| Practical teaching | 20 | Oral examination | 45 |
| Teaching colloquia | 30 |  |  |
| Seminar |  |  |  |