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| **Study program:** Doctoral academic studies **-** Chemistry | | |
| **Course title:** Humic Substances in the Environment (H343C) | | |
| **Name of lecturer/lecturers:** Tatjana D. Anđelković | | |
| **Type of course:** elective | | |
| **Number of ECTS allocated:** 10 | | |
| **Course objectives**  Origin of humic substances, their isolation and characterization. Special attention will be paid on the study of basic processes in the hydrosphere and pedosphere in which humic substances participate, with a focus on interactions that can contribute to the distribution of pollutants and change the existing balance in the natural environment. | | |
| **Course outcomes**  By applying the acquired knowledge about the nature of humic substances, their structure and basic ways of interaction in the pedosphere and hydrosphere, the student will be able to independently study, predict and define their influence and the interaction they can achieve with various environmental pollutants of anthropogenic or natural origin. | | |
| **SYLLABUS**  *Lectures*  Classification, distribution and synthesis of humic substances. Isolation, fractionation and purification of humic substances (extraction of humic substances from soil; isolation and concentration of humic substances from water; fractionation of terrestrial and aquatic humic substances). Characterization of humic substances by chemical and physical methods. Chemical structure of humic substances (hydrolysis, oxidative degradation, reductive degradation, biological degradation). Reactions of humic substances with metal ions. Reactions of humic substances with hydrated oxides. Reactions of humic substances with clay. Reactions of humic substances with organic compounds. | | |
| **References**  1. Е. Tipping, Cation binding by humic substances, Cambridge, 2002.  2. W. White, Geochemistry, John-Hopkins University Press, 2005.  3. W. Stumm, J. J. Morgan, Aquatic Chemistry, John Wiley & Sons, New York, 1996.  4. G. Aiken, D. McKnight, R. Wershaw, P. MacCarthy, Humic substances in soil, sedimentand water, John Wiley  & Sons, 1985  5. M. Schitzer, S. U. Khan, Humic substance in the environment, Marcel Dekker, New York,1972  6. Serija elektronskih nastavnih materijala razvijenih u okviru ERASMUS+ NETCHEM projekta (http://mdl.netchem.ac.rs/course/view.php?id=10 ). | | |
| **Active teaching classes** | **Lectures:** 105 | **Laboratory work:** / |
| **Teaching mode:** interactive lectures, seminar, consultations | | |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** | | |
| seminar – 20 points; solving the given problem - 30 points; oral exam - 50 points | | |