|  |
| --- |
| **Study program** Chemistry |
| **Course title** Separation Methods in Chemistry 1 (H122C) |
| **Name of lecturer/lecturers**  Snežana B. Tošić |
| **Type of course** Elective |
| **Number of ECTS allocated** 4 |
| **Course objectives** Acquiring the necessary knowledge in the field of physicochemical basics and principles of various methods of separation. Training students for proper selection and application of the appropriate method of separation. |
| **Course outcomes**. The student can:- understand the physical and chemical bases and principles of separation methods,- make the correct choice of method for separating the analyzed substance or interferent,- practically apply the basic separation techniques when working in an analytical laboratory. |
| **SYLLABUS***Lectures* Introduction. Basic terms - analyte, interferent, selectivity coefficient, utilization factor, separation factor, relative error, masking as pseudo-separation method. Classification of separation methods. Precipitation. Crystallization. Sublimation. Extraction: types, fundamental extraction principles, extraction coefficient, extraction efficiency, multiple extraction, separation coefficient, chelate complexes, ion-associative complexes, balances in liquid extraction during complex building, synergistic extraction, species extraction techniques. Electrophoresis: electrophoretic mobility, classification of methods, paper electrophoresis, gel electrophoresis, disc electrophoresis, capillary electrophoresis. Chromatography: basic principles, classification of chromatographic methods according to different criteria, capacity factor, selectivity factor, retention ratio, retention time, retention equations, theories of chromatography separation processes, paper chromatography (ascending, descending, one-dimensional, two-dimensional, circular), column chromatography (adsorption, separation), thin-layer chromatography, qualitative and quantitative analysis. Introduction to the following separation methods: high pressure liquid chromatography (HPLC), gas chromatography (GC), ion exchange chromatography (IEC), gel (exclusion) chromatography (SEC).*Laboratory work* Thin-layer chromatography on silica gel - separation of indicators. One-dimensional ascending paper chromatography - separation and identification of Mg2+, Ca2+, Sr2+ and Ba2+. Circular paper chromatography - separation and identification of Cl-, Br-, I-, SCN-. Adsorption eluent chromatography on acid Al2O3 column - separation of dichromate and permanganate. Separation of zinc and magnesium in chloride form on anionic resin Duolite A113. Separation of Fe(III) by extraction (8-hydroxyquinoline, chloroform). Separation of nickel by extraction (dimethyldioxide, chloroform). Separation of NH4Cl by sublimation. |
| **References**1. Ružica Micić, Snežana Tošić, Metode odvajanja u analitičkoj hemiji, Univerzitet u Kosovskoj Mitrovici, Prirodno-matematički fakultet, Kosovska Mitrovica, 2019.2. Milan N. Mitić, Hromatografske metode, Univerzitet u Nišu, Prirodno-matematički fakultet, Niš, 2017.3. J. M. Miller, Separation Methods in Chemical Analysis, John Wiley & Sons, New York, 1975. |
| **Active teaching classes** | **Lectures** 30 | **Laboratory work** 15 |
| **Teaching mode** Lectures, colloquiums, seminars, consultations |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** |
| **Pre exam duties** | **Points** | **Final exam**  | **Points** |
| Activity during lectures | 5 | Written examination | / |
| Practical teaching | 15 | Oral examination | 30 |
| Colloquiums | 30 |  |  |
| Seminars | 20 |  |  |