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| **Study program** Chemistry |
| **Course title** Instrumental methods in organic chemistry (H131C) |
| **Name of lecturer/lecturers** Gordana S. Stojanović |
| **Type of course** Obligatory |
| **Number of ECTS allocated** 7 |
| **Course objectives**• Acquiring knowledge about ultraviolet (UV), visible (VIS), and infrared (IR) spectroscopy, nuclear magnetic resonance (NMR) and mass spectrometry (MS).• Developing the ability to understand the relationship between spectroscopic data of organic compounds and their structures.• Developing skills for determining the structure of organic compounds based on UV, VIS, IR, NMR, and MS spectra. |
| **Course outcomes**After successful completion of this course, the student can:• Determine the structure of the organic compound based on UV, VIS, IR, NMR, and MS spectra.• Explain the position of the signal in the spectra. |
| **SYLLABUS***Lectures*Introduction. Overview of modern instrumental methods in organic chemistry. Ultraviolet and visible spectroscopy. Absorption intensity. Width and fine structure of UV absorption bands. Chromophores. Characteristic absorptions of organic compounds. Interpretation of spectra. Quantitative analysis. Infrared spectroscopy. Fundamental bands and overtones. Combination bands. Fourier-transform infrared spectroscopy (FTIR). Characteristic IR bands of functional groups. Nuclear magnetic resonance. Proton NMR spectra. Chemical shifts of protons. Dependence of chemical shifts of the structure and geometry of the molecule. Proton shielding. Spin coupling. Dynamic proton NMR. Basics of 13C NMR. Mass spectrometry. Introduction. Types of ions in mass spectrometry. Characteristics fragmentation of organic compounds.*Laboratory work*Determination of the structure of organic compounds based on their UV, VIS, IR, NMR and MS spectra |
| **References**1. S. Milosavljević, Strukturne instrumentalne metode, Hemijski fakultet, Beograd, 1996.2. M. Hesse, H.Meier, B.Zeeh, Spectroscopic methods in Organic Chemistry, Verlag, 1997.3. R. Silverstein, G.Bassler, T.Morrill, Spectrometric Indentification of Organic Compounds, J.Wiley and Sons,NewYork, 1991.4. B. Radovanović, Uvod u masenu spektrometriju, Prirodno-matematički fakultet, Niš, 2011.5. V. Tešević, Osnove masene spektrometrije organskih jedinjenja, Hemijski fakultet, Beograd, 2013. |
| **Active teaching classes** | **Lectures** 60 | **Laboratory work** 45 |
| **Teaching mode** The lecture will be a PowerPoint presentation, with students' involvement in the discussion. A practical determination of the structure of organic compounds based on spectra in exercise classes |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** |
| **Pre exam duties** | **Points** | **Final exam**  | **Points** |
| Activity during lectures | 5 | Written examination | 40 |
| Practical teaching | 10 | Oral examination | / |
| Teaching colloquia | 45 |  |  |