Study program/study programs: **Master Academic Studies in Chemistry**

Type and level of studies: **Master of Science Degree**

Course name: **NMR spectroscopy** | Course Code **IHO-305**

1st semester of master studies

Teacher: Assistant professor Srđan Bjedov

Course status: **Obligatory**

Number of ECTS credits: **7**

Requirement: **None**

Course aim

The course aims to provide an understanding of how the chemical structures and dynamics of organic molecules can be studied by NMR spectroscopy.

Course outcome

After successful completion of the course, the participant should have the ability to:

- account for the theoretical foundation of the most commonly used NMR experiments
- relate NMR parameters such as chemical shift, scalar coupling constants, and relaxation time constants to molecular structure
- the ability to investigate and determine the structure of typical organic chemical compounds (molecular weight up to ca. 500 Da) using suitable nuclear magnetic resonance experiments
- perform the most commonly used NMR experiments, and to interpret and docoument their results

Course content

Fundamentals of the NMR phenomenon, relationship between NMR spectra and molecular structure. Recording of routine spectra (^{1}H and ^{13}C). 1D NMR techniques: Decoupling, DEPT, relaxation measurement, NOE difference spectra. 2D NMR techniques: Homo- and heteronuclear correlation (COSY, TOCSY, HSQC, HMBC), measurement of the nuclear Overhauser effect (NOESY, ROESY). Emphasis is on learning the practical use of NMR equipment

Literature

1. J. P. Hore; Nuclear Magnetic Resonance (Oxford Chemistry Primers), 2015.
2. William Kemp; NMR in Chemistry, a multinuclear introduction, Macmillan, 1988.
3. R.M. Silverstein, F.X. Webster, D. J. Kiemle, D. L. Bryce; Spectrometric identification of organic compounds, 8th edition, John Wiley & Sons, Inc., New York, 2015.

Number of classes of active teaching				Other classes
Lectures: 3 (45)	Practice: 3 (45)	OFT: /	SRW: /	/

Teaching methods

Lectures, laboratory work, consultation

Assessment of knowledge (maximum of 100 points): 100

Pre-exam obligations	**Points**	**Final exam**	**points**
activity during lecture classes	10	written exam	30
practical teaching	20		
midterm exam	20		
seminars	20		