

212044 – EXPERIMENTS OF NUCLEAR MAGNETIC RESONANCE

CREDITS: 04 (four) – 60 hours/class

CONTENT:

1. Fundamentals Nuclear Magnetic Resonance 1D and 2D of nuclei with spin number 1/2 (1H, 13C, 31P, 19F).
2. Obtaining UNI- (1H, 13C, DEPT, NOE) and BIDIMENSIONAL (COSY, HSQC, HMBC and NOESY) spectroscopic measures involving the following topics:
 - I. Preparation of the sample: attention in the choice of solvent, of the tubes; different types of sample.
 - II. Equipment setup: knowledge about the various parts of the equipment (amplifier, preamplifier, variable temperature unit and various types of probes); tuning / matching and shimming adjustments.
 - III. Set up the parameters involved in the experiments: main acquisition and processing parameters.
3. Data analysis: main steps involved in the processing of spectra.

SYLLABUS:

1. Preparation of the sample: attention on the choice of solvent, of the tubes.
2. Fundamentals of Nuclear Magnetic Resonance 1D:
 - a) RMN-1H
 - b) RMN-13C
 - c) Dept 90, Dept 135
 - d) RMN-31P
 - e) RMN-19F
3. Fundamentals of 2D Nuclear Magnetic Resonance:
 - a) COSY
 - b) HSQC
 - c) HMBC
 - d) NOESY
4. Obtaining UNIDIMENSIONAL spectroscopic measurements:
 - a) RMN-1H
 - b) RMN-13C
 - c) Dept 90, Dept 135
 - d) RMN-31P
 - e) RMN-19F
 - f) NOE
5. Preparation of 1H-RMN spectra with temperature variation.
6. Obtainment of spectroscopic measurements BIDIMENSIONAL:
 - a) COSY
 - b) HSQC
 - c) HMBC
 - d) NOESY
7. Data analysis: main steps involved in the processing of spectra.

BIBLIOGRAPHY:

1. SILVERSTEIN, R.M.; WEBSTER, F.X.; KIEMLE, D. Spectrometric Identification of Organic Compounds. 7.ed. John Wiley & Sons, N.Y., EUA. 2005.
2. PAVIA, D.L.; LAMPMAN, G.M.; KRIZ, G.S. Introduction to Spectroscopy. 3.ed. Thomson Learning, USA, 2001.
3. CLARIDGE, T.D.W. High Resolution NMR Techniques in Organic Chemistry: tetrahedron organic chemistry. V.27. 2.ed. Elsevier Science, Amsterdam, 2009.