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Instituto de Química
Graduate Program in Chemistry (Grade 7/CAPES)
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COURSE SYLLABUS

1. Identification

Code and title: QUP 169 – Nuclear Magnetic Resonance (NMR) II
Professor: Francisco Paulo dos Santos
Level: Master and Doctorate
Credit hours: 3
Revised: August_2019

2. Summary

Fundamentals of the NMR phenomenon, advances techniques in 1D and 2D, recent trends in NMR (fundamentals of pulse techniques) and recent trends in applications of NMR.

3. Objective

Student has knowledge on the fundamentals of the NMR phenomenon, pulse sequences. Account for the theoretical foundation of the most commonly and recent advances in NMR experiments.

4. Contents

- Nuclear Spin and Resonance
- NMR phenomenon
- Chemical Shift
- Coupling Constant
- Polarization transfer DEPT, INEPT
- Pulse sequences
- Correlations through the chemical bond – homonuclear shift correlation - COSY, TOCSY.
- Correlations through the space – The nuclear Overhauser effet- NOESY- ROESY
- Correlations through the chemical bond – heteronuclear shift correlation – HETCOR, HMQC, HSQC, HMBC and others

5. Assessment

List of exercises, presentation and discussion of scientific articles and final test. The student, who obtains a final grade of A, B or C, awarded as per the list below, will be considered approved:
A: grade equal to or above 9.0
B: grade equal to or above 7.5 and below 9.0
C: grade equal to or above 5.0 and below 7.5
D: grade below 5
FF: lack of frequency

6. Methodology

Lectures, exercises lists, seminars and examinations.

7. Bibliography

- J. Keeler, Understanding NMR Spectroscopy, Ed. Wiley, 2005.
- T. D. W. Claridge, High-Resolution NMR Techniques in Organic Chemistry, Tetrahedron Organic Chemistry, 27, Ed. Elsevier, 2009.
- M. Balci, Basic ^{1}H-^{13}C-NMR Spectroscopy, Elsevier, Amsterdan, 2005.
- M. Levitt, Spin Dynamics: Basics of Nuclear Magnetic Resonance, Wiley, 2nd Ed., 2008.
- S. Braun, H. O Kalinowski e S. Berger, 150 and More Basic NMR Experiments Wiley VCH.