

## COURSE SYLLABUS

### 1. Identification

Code and title: QUP 173 – Supramolecular Chemistry

Professor: Fernanda Poletto

Level: Master and Doctorate

Credit hours: 2

Revised: August\_2019

### 2. Summary

Non-covalent bonds and hydrophobic effect. Host-guest type systems. Mechanisms of self-association and molecular recognition in a liquid medium. Introductory concepts on supramolecular catalysis and biomimetics. Supramolecular chemistry in the solid state. Dynamic covalent chemistry. Applications in cutting edge topics such as supramolecular photochemistry, molecular machines and supramolecular devices for biomedical applications.

### 3. Objective

Provide an introductory overview of the principles and applications of supramolecular chemistry. During the course, the student is invited to build knowledge based on case studies and recent publications in the scientific literature, presented after approaching the key concepts related to each topic worked on. At the end of the course, the student is expected to be able to understand the functioning of supramolecular structures of biological and synthetic origin, based on the concepts covered in the classes.

### 4. Contents

- Basic concepts. Nature of supramolecular interactions. Solvation and hydrophobic effect.
- Host-guest systems: receptors for cations, anions, ion pairs and neutral molecules.
- Biomimetic systems and supramolecular catalysis principles.
- Inclusion compounds in solid state. Crystal engineering.
- Self-associated systems and supramolecular tangles. The nature of the mechanical link.
- Interfaces and self-associated structures in a liquid medium.
- Applications

### 5. Assessment

Two evaluations will be carried out throughout the course. The first consists of the presentation of seminars dealing with the themes discussed in class, based on scientific articles in the literature. The second assessment consists of a written 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. Handling of statistical processing software

## 7. Bibliography

- J. W. Steed and J. L. Atwood, "Supramolecular Chemistry", J. Wiley & Sons: Chichester, 2009.
- H. J. Schneider and A. Yatsimirsky, "Principles and Methods in Supramolecular Chemistry", J. Wiley & Sons: Chichester, 2000.
- J. M. Lehn. "Supramolecular Chemistry: Concepts and Perspectives", Wiley-VCH: Weinheim, 1995.
- J. W. Steed, D. R. Turner and K. Wallace, "Core Concepts in Supramolecular Chemistry and Nanochemistry", J. Wiley & Sons: Chichester, 2007.
- N. J. Turro, V. Ramamurthy and J. C. Scaiano, "Modern Molecular Photochemistry of Organic Molecules", University Science Books, 1st edition (January 5, 2010).