Code: **QI854**

Name: **Magnetoquímica: Fundamentos e Aplicações em Materiais Moleculares**

Name in English: **Magnetochemistry: Fundamentals and Applications in Molecular Materials**

Name in Spanish: **Magnetoquímica: Fundamentos y Aplicaciones en Materiales Moleculares**

Subject type: **Weekly**

Approval Type: **Grade and frequency**

Characteristic: **Regular**

Frequency: **75%**

Period Type / Offering period: **Semestral / All periods**

Requires Final Exam: **Yes**

Vectors

| T | L | P | O | PE | OE | SL | WEEKS | CREDITS |
|---|---|---|---|---|---|---|---|---|
| **2** | **-** | **-** | **-** | **-** | **-** | **2** | **15** | **2** |

Occurrence on curriculum:

Pre requirement: **QI345 or QI346**

**Summary:** Origins of the magnetic moment. Magnetic properties of free ions. Quenching of the orbital magnetic moment. Magnetic interactions mechanisms. Properties of purely organic or coordination compound based molecular magnets.

**Program**:

- Origins of the magnetic moment, diamagnetism, paramagnetism, Curie and Curie-Weiss law;
- Paramagnetism and Crystal Field: magnetic properties of free ions; quenching of the orbital magnetic moment; coordination compounds; Jahn-Teller effect.
- Interactions mechanisms; low dimensional magnetism (dimers and clusters); Single-Chain Magnets; Alternated Chains; two-dimensional systems.
- Long range order; ferromagnetism; antiferromagnetism; domain theory; magnetization curves; hysteresis curves.
- Molecular magnets: purely organic; coordination compounds.
- Experimental techniques: magnetometry and electronic paramagnetic resonance.

**Basic Bibliography**

1) EARNSHAW, A. Introduction to Magnetochemistry. London: Academic Press, 1968. 115p.
2) CARLIN, R. L. Magnetochemistry. New York: Springer-Verlag, 1986. 328p.
3) BENELLI, C.; GATTESCHI, D. Introduction to molecular magnetism: from transition metals to lanthanides. Weinheim: Wiley-VCH, 2015. E-book.

**Supplementary Bibliography**

1) KAHN, O. **Molecular Magnetism.** New York: Verlag-Chemie, 1993. 380p.
2) ORCHARD, A.F. **Magnetochemistry.** Oxford: Oxford University Press, 2003. 172p.
3) GATTESCHI, D. **Molecular nanomagnets.** Oxford : Oxford University Press, 2006. 395p.
4) LAYFIELD, R.A.; MURUGESU, M. **Lanthanides and Actinides in Molecular Magnetism.** Weinheim: Wiley-VCH, 2015. E-book.
5) WINPENNY, R. **Single-Molecule Magnets and Related Phenomena.** Berlin, Heidelberg: Springer Berlin Heidelberg, 2006. E-book.
6) Selected papers.