Code: **QI246**

Name: **Inorganic Chemistry**

Name in English: **Inorganic Chemistry**

Name in Spanish: **Química Inorgánica**

Subject type: **Weekly**

Approval Type: **Score and Frequency**

Characteristic: **Regular**

Frequency: **75%**

Period Type / Offering period: **Semestral / 2º period - pair**

Requires Final Exam: **Yes**

Vectors

T	L	P	O	PE	OE	SL	WEEKS	CREDITS
4	-	-	-	**-**	**-**	4	**15**	**04**

Occurrence on curriculum: **05, 63**

Pre requirement: **QG108**

Summary: Lewis acidity and basicity: hard and soft acids and bases. Coordination and organometallic chemistry of transition metals.

Program:

Acids and Bases

Lewis Acids and Bases: periodic trends; basic types (adduct formation correlating with OM; displacement reactions, metathesis; solvents as acids or bases; strength of acids and bases). Structural considerations and steric factors in the strength of acids and bases. Hard and soft acids: the concept of Pearson. Acidity and basicity of metal and non-metal oxides.

Coordination Chemistry

Coordination compounds: coordination number, structure, nomenclature, isomerism. Bonding models: molecular orbitals and crystal field theory for octahedral, tetrahedral and square planar geometries. Jahn-Teller effect. Spectrochemical series. Nephelauxetic effect. Interpretation of electronic spectra and determination of ligand field parameters (10 Dq and B); charge transfer spectra (L-M and M-L). The chelate effect (thermodynamic aspects). Macrocyclic ligands. Substitution reactions in octahedral and square planar complexes. The -trans effect and influence. Labile and inert compounds. Redox reactions.

d-block organometallics

Concepts, definitions and main ligands (CO, PR_3). The 18 electrons rule. M-CO and M-PR_3 bonding. Main reactions occurring in the coordination sphere of organometallic, analyzing their mechanisms and the factors affecting them: Ligands replacement; Oxidative addition / reductive elimination; Insertion / migration and reverse reaction. Introduction to organometallic catalysis: definitions, influence of the metal and examples of catalytic cycles.

Basic Bibliography

1) HOUSECROFT, C. E., SHARPE, A. G. **Inorganic Chemistry**. 4th ed. Upper Saddle River. NJ : Prentice-Hall, 2012. 754p

2) SHRIVER, D. F., ATKINS, P. W., LANGFORD, C.H. **Inorganic Chemistry**. 2nd. ed. Oxford : Oxford University Press, 1994. 819p 3)

3) HUHEEY, J. E., KEITER, E. A., KEITER., R. L. **Inorganic Chemistry: Principles of Structure and Reactivity**. 4th ed. New York : Harper Collins, 1993. 964p

Supplementary Bibliography

1)MIESSLER, G. L., TARR, D. A. **Inorganic Chemistry.** 4th ed., Harlow : Pearson, 2011. 1213p.

2) LIPPARD, S. J., BERG, J. M. **Principles of Bioinorganic Chemistry**. Mill Valley: Univ. Science Books, 1994.

3) DUPONT, J. **Química Organometálica: Elementos do Bloco** d. Porto Alegre : Bookman, 2005. 300p.

4) STROHFELDT, K. A. **Essentials of Inorganic Chemistry: For Students of Pharmacy, Pharmaceutical Sciences and Medicinal Chemistry.** 1st ed. Chichester: John Wiley & Sons Ltd, 2015. 263p. E-book.
5) HOUSE, J. E. **Inorganic chemistry**. 3rd ed. London: Academic Press, 2020. 966p. E-book.