Code: **QI851**

Name in English **Bioinorganic Chemistry**

Name in Portuguese: **Química Bioinorgânica**

Name in Spanish: **Química Bioinogánica**

Type of course: **Weekly**

Evaluation and approval criteria: **Grade and frequency**

Characteristics: **Regular**

Frequency: **75%**

Period Type / Offering Period: **Semi-annual / All periods**

Requires Exam: **Yes**

Vector

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

Occurrence in curriculum:

Pre requirement: None

Summary: Concepts and definitions in Bioinorganic Chemistry. Metal ions in biological systems. Essential elements to the human organism (zinc, iron, copper and others) and poisonings caused by heavy metals (lead, mercury and cadmium). Metal complexes in medicine: planning, synthesis and applications.

Program:

Bioinorganic chemistry: concepts and definitions.
Metal ions in biological systems: physiological and pathological aspects.
Zinc and its role as a cofactor of enzymes.
Aspects of iron metabolism: transport (hemoglobin) and storage (myoglobin) of oxygen in the human body.
The biochemistry of copper in biological systems.
Other essential elements (for example, Mn, Co and Mo).
Heavy metals: deficiencies caused by the accumulation of Pb2 +, Cd2 + and Hg2 + in the human organism.
Metal complexes in medicine: planning, synthesis and applications.
Platinum complexes in the treatment of cancer;
Gold complexes as anti-inflammatories;
Silver complexes as antimicrobials.

Basic Bibliography

1) WELLER, M. OVERTON, T. ROURKE, J. ARMSTRONG, F. **Química Inorgânica**. 6ª Ed. Porto Alegre: Bookman, 2017. 866p.
2) H.-B. Kraatz, N. Metzler-Nolte (Eds.). **Concepts and Models in Bioinorganic Chemistry**. Wiley-VCH, Weinheim, 2006. 446p.
3) Lippard, S. J.; Berg J. M. **Principles of Bioinorganic Chemistry**. Mill Valley: University Science Books, 1994. 411p.

Complementary Bibliography

1) H. E. BERALDO, **A Química Inorgânica na terapia do câncer. Cadernos temáticos de Química Nova na Escola**, 6, 13-18, 2005.
2) S. MEDICI, M. PEANA, V.M. NURCHI, M.A. ZORODDU, **Medical uses of silver: history, myths, and scientific evidence, Journal of Medicinal Chemistry**, 62, 5923–5943, 2019.

3) PAIVA, R.E.F.; MARÇAL NETO, A.; SANTOS, I.A.; JARDIM, A.C.G.; CORBI, P.P.; BERGAMINI, F.R.G. **What is holding back the development of antiviral metallodrugs? A literature overview and implications for SARS-CoV-2 therapeutics and future viral outbreaks,** Dalton Transactions, 49, 16004–16033, 2020.
4) SIGEL, A. SIGEL, H. (EDS.), **Metal Ions in Biological Systems - metal ions and their complexes in medication** (v.41), CRC Press 2004.
5) MERTZ, W. (ED.), **Trace elements in human and animal nutrition** (v. 1 and 2). 5th. ed., Academic Press 1986.