



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Fisica e Chimica - Emilio Segrè
ACADEMIC YEAR	2021/2022
MASTER'S DEGREE (MSC)	CHEMISTRY
SUBJECT	COORDINATION AND BIOINORGANIC CHEMISTRY
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50483-Discipline chimiche inorganiche e chimico-fisiche
CODE	16492
SCIENTIFIC SECTOR(S)	CHIM/03
HEAD PROFESSOR(S)	PELLERITO CLAUDIA Ricercatore Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	1° semester
ATTENDANCE	Mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	PELLERITO CLAUDIA Thursday 14:00 15:00 studio Pellerito presso edificio 17 , Dipartimento Fisica e Chimica, Viale delle Scienze

DOCENTE: Prof.ssa CLAUDIA PELLERITO

PREREQUISITES	basic of general chemistry
LEARNING OUTCOMES	Knowledge and ability 'to understand Knowledge of the structure and physical-chemical properties' of metal complexes. Acquisition of advanced tools for the study of coordination compounds and their interaction with biological systems Capacity 'to use the specific language of bioinorganic chemistry and coordination chemistry Capacity 'to recognize coordination compounds present in biological systems and to predict the reactivity' and the structural features that influence the systems in which they are present. Capacity 'to detect metal ions with physiological or toxic effects Making judgments Being able to Interpret critically experimental data on the synthesis, the properties' and the use of coordination compounds. Being able to evaluate the biological implications of alterations or structural variations of the naturally existing complex in biological systems, or to assess the biological effect of synthesis of complexes based on their chemical composition Communication skills Argued consistently aspects of the chemistry of coordination compounds on the basis of the knowledge acquired. Capacity 'to expose the assessments and reflections on even to a non-expert public issues addressed. Being able to support the importance and highlight the environmental and biological effects of the presence of the metal ions and their complexes Capacity 'Learning Ability 'to upgrade with the consultation of its scientific publications of the chemistry of coordination compounds, toxicology and bioinorganic chemistry. Capacity 'to follow, using the knowledge acquired in the course, both second-level master's degree, both in depth courses both specialized seminars in the bioinorganic chemistry.
ASSESSMENT METHODS	oral exam. The interview will help to evaluate either by questions posed to simulate real-world applications of teaching content , capacity student to develop the knowledge gained by using them to overcome problems that are placed , and the ability 'to speak with a technically correct language on teaching content. The assessment is expressed in thirtieths . The final assessment, properly graded, will be made on the basis of the following conditions: a) sufficient knowledge of subjects and theories addressed in the course and sufficient explanation ability; sufficient degree of awareness and autonomy in the application of theories to solve chemical problems (rating 18-21); b) Good knowledge of subjects and theories addressed in the course and discrete explanation ability; fair degree of awareness and autonomy in the application of theories to solve chemical problems (rating 22-25); c) Good knowledge of subjects and theories addressed in the course and good explanation ability; good degree of awareness and autonomy in the application of theories to solve chemical problems (rating 26-28); d) Excellent knowledge of subjects and theories addressed in the course and excellent explanation ability; excellent level of awareness and autonomy in the application of theories to solve chemical problems (rating 29-30L).
EDUCATIONAL OBJECTIVES	Aims of the course is to give students knowledge on coordination compounds present in biological systems and predict their reactivity ' and structural characteristics that influence the systems in which they are present . In addition Students would be able to identify the metal ions with physiological, therapeutic or toxic role .
TEACHING METHODS	Teaching takes place in the first half of the year and consists of lectures by Power Point presentations or reading recent articles from international scientific journals
SUGGESTED BIBLIOGRAPHY	-Inorganic Chemistry; G.L. Miessler, D.A. Tarr; Prentice Hall, 4th edition, 2010 -Group Theory and Chemistry; D.M. Bishop; Dover, 1993 - SJ Lippard-JM Berg Principles of Bioinorganic Chemistry , Ed. University Science Books 1994 -Wolfgang Kaim, Brigitte Schwederski "Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life." John Wiley and Sons, 2nd ed., 2013 - G.L.Miessler, D.A.Tarr - Inorganic Chemistry, Ed. Prentice Hall 3rd ed., 2004 -J.A.Cowan - Inorganic Biochemistry. An introduction Ed.Wiley, 2nd ed. 1997 -J.J.R. Frausto da Silva and R.J.P. Williams, The biological chemistry of the elements: The inorganic chemistry of life, 2nd Edition, Oxford University Press. Bibliografie recenti di settore (es. Metallomics, J.of Inorg Biochem)) per eventuali approfondimenti tramite consultazione di librerie online.

SYLLABUS

Hrs	Frontal teaching
6	basic coordination chemistry. Valence bond theory, MO theory, Crystal fields theory, 10dQ, Ligands classification, coordination compound definition, structure, isomers
8	Coordination compounds: synthesis, characterization and biological activity. references.
10	occurrence and availability of inorganic elements in organisms; metallomics; system biology; trace and ultratrace elements; biological functions of inorganic elements; physiology, homeostasis, trafficking, storage
4	heavy metals, toxicity, interaction with biological molecules (tin, arsenic, mercury, lead, cadmium)
3	metal ions in pharmacology: diagnostics, therapeutics(platinum, gadolinium, gold)
5	iron proteins (heme, non heme, iron sulfur clusters,) oxygen transports, iron mobilization, transport and storage. Iron containing enzymes (cytochromes, catalase, peroxidase)
5	copper proteins (blue copper centers, oxidase-reductase, ceruloplasmin, azurin, plastocyanin) ; copper trafficking. Copper containing enzymes
4	Zinc proteins (zinc fingers); zinc trafficking ; zinc containing enzymes
2	more metalloproteins and enzymes (Ni, vanadium, Mo), metallothioneins
1	research fields and interest in Italy, Europe and USA. Biomet-Pharmacobiometallics Abstract, Perspectives