Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2018-2019

Course Handout (Part - II)

Date: 07/01/2019

In addition to part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : CHEM F343
Course Title : Inorganic Chemistry III
Instructor-in-charge : **R. KRISHNAN**
Instructor : AMIT A VERNEKAR

Course Description: Overview of coordination complexes. Introduction to Bioinorganic chemistry - the essential bio-selective metal ion accumulation, storage, transport mechanisms, and the structural and mechanistic aspects of metalloenzymes. Toxicity of some metal ions - mercury, cadmium, copper, arsenic, etc. Medicinal inorganic chemistry - Application inorganic molecules for medicines and chelation therapy. Molecular magnetism and emerging topics in current inorganic chemistry.

Scope and Objectives: Inorganic elements play vital role in our biological systems for the structural stabilizations and functioning for proteins and enzymes. The scope and objective of the course is to learn importance and extended applications of inorganic chemistry in nature from Biosystems to applied material chemistry for a healthy life in our ecosystem.

Text Book:
T1. I. Bertini, H. B. Gray, S. J. Lippard, J. S. Valentine, "Bioinorganic Chemistry", Viva, 1998.
T2. Donald R. Askeland, Pradeep P. Phule, The Science and Engineering of Materials", Fourth Edition, Thomson, 2003.

Reference Books:
R1. K. Hussain Reddy, "Bioinorganic Chemistry", New Age International Publishers, 2009.
R2. E. Ochiai, "Bioinorganic Chemistry: A Survey", Academic Press, 2008.
R3. Keith F. Purcell and John C. Kotz, "Inorganic Chemistry", Cengage Learning, 2010.
R4. Recent research journal papers.

Course Plan:

Lecture No.	Learning Objectives	Topics to be covered	Chapter in the Text Book
1	Bioinorganic chemistry	Introduction to Bioinorganic Chemistry	R2
2-4	Metal ion storage	Metal ion storage, transport and biomineralization	T1(Ch 1), R4
5-7	Oxygen carriers	Oxygen carriers: Iron and copper in biological systems	T1(Ch 4)
8-10	Oxygenases	Oxygenation reaction: iron and copper	
11-13	Ca, Mg and Zn	Calcium, magnesium and zinc in biological systems	T1(Ch 2,3)

14-15	Photosynthesis	Photosynthesis and artificial photosynthetic models	T1(Ch 7), R4
16-17	Vitamin B_{12}	Cobalt in biological systems	T1(Ch 2), R2
18-20	Other essential elements	Ni, Mo, V in biological systems	R4
21-24	Electron transfer	Electron transfer and redox processes in biological systems	T1(Ch 6)
25-27	Metal-sulfur proteins	Metal-sulfur proteins and metalloenzymes	T1(Ch 7)
28-29	Metal-Nucleic acid	Metal-Nucleic acid interactions	T1(Ch 8)
30-31	Environmental inorganic chemistry	Toxicity of metal ions and environmental bioinorganic chemistry	R2
32-34	Metal in medicine	Medicinal inorganic chemistry	T1(Ch 9)
35-36	Coordination chemistry	Metal coordination complexes: an overview	R3
37-38	Magnetic materials	Magnetic properties and metal clusters	T2(Ch 19)
39-40	Recent inorganic topics	Recent selected research topics in inorganic chemistry	R4

Evaluation Scheme: (**Total 200 Marks)**

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Components	Duration	Marks (Weightage)	Date & Time	Remarks
Midsem Test	1.5 h	64 (32%)	16/3 3.30 - 5.00 PM	CB
Class test/Assignments and Presentation	--	50 (25%)	Continuous	OB
Compre. Exam	3 h	86 (43%)	14/05	CB

***** The comprehensive examination will have a quiz portion with 15% Weightage, and a descriptive section with 28% Weightage (both closed book).

Surprise tests, assignments and seminars will be conducted during the class hours. The surprise tests components will be of a short answer type based on the lectures covered recently. Students may be given any topic relevant to this course and provided/suggested supporting materials in advance for the preparation of presentations.

Learning outcome of this course:

- Learn and appreciate the important roles of inorganic chemistry in our biological and material world.
- Exploring the specific functions and mechanisms of action of various metal containing enzymes.
- Medicinal applications of inorganic compounds.

Make-up policy: Make up would be considered only for very genuine reasons *such as institute deputation outside for sports/cultural fest, hospitalization (with appropriate documentary proof), marriage ceremony of own brother/sister (not cousins*). There will not be any makeup possible for the surprise test class components.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Chamber Consultation Hours: Monday, 3:00 – 4:00 PM

Notices: Notices, if any, concerning the course will be displayed on the Chemistry Notice Board only.

Instructor in charge

R. KRISHNAN