



Inorganic Chemistry of Life: Principles and Perspectives Chemistry and Biochemistry

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Institute: IIT Bombay

Department: Chemistry and Biochemistry

Course Intro: : It is a general belief that inorganic means lifeless. However, if you analyze the life there is a huge contribution of inorganic chemistry to life and life processes. Therefore, this course is intended to give the involvement and role of inorganic ions and species particularly in the context of enzymes. In addition several inorganic salts and complexes act as drugs and learning this will support the knowledge gained in this course in a cooperative manner and hence the interaction of inorganic complexes with the tissue and their characteristics as drugs will also be highlighted. All this will be dealt at principles and perspectives level and hence useful to both the bachelor and masters students

Pre Requisites: : Plus two Inorganic chemistry and Plus two biology

Core/Elective: : Both

UG/PG: : PG

Industry Support : None

Reference : 1 Inorganic biochemistry an introduction 2nd Edition J.A.Cowan Wiley VCH, 2 Principles of Bioinorganic chemistry Stephen J Lippard, Jeremy M Berg University science books 2002 3 The Biological chemistry of elements The Inorganic Chemistry of Life J J R daSilva, R J P Williams Clarendon press, Oxford press 1991 4 Concepts and Models in Bioinorganic chemistry Edited by Heinz-Berhard Kraatz, Nils Metzler Nolte Wiley VCH 5 Biochemistry Voet and Voet 4th edition John Wiley and sons Inc

About Instructor: Prof. C.P. Rao currently holds Institute Chair Professorship in Dept of Chemistry, IIT Bombay wherein he is a faculty since 1988. He did his MSc from IIT Madras, PhD from IISc., Bangalore, and two post doctoral stints one at Harvard University and the other at MIT. He has been teaching UG, PG and Ph.D. students at IIT Bombay for over three decades. His research interest spans across Biological Inorganic and Supramolecular chemistry using small synthetic molecular systems as well as proteins with an extension of the studies to biological cells, and the efforts are way into nanobiomaterials. His research group extensively uses spectroscopy, microscopy and diffraction techniques besides practicing biochemical methodologies including antiproliferative activity. Till now 31 PhD and 55 MSc students completed their degrees and published over 200 papers in journals of international repute and completed a number of research projects sponsored by DST (SERB, Nano Mission), CSIR and DAE-BRNS.



COURSE PLAN

SL.NO	Week	Module Name
1	1	How do one get feel of inorganic chemistry of life
2	1	
3	1	
4	1	
5	1	
6	2	Mapping the elements with the binding sites in biological systems
7	3	Site targeted mutagenesis
8	4	Metalloproteins and metalloenzymes general perspectives
9	5	Enzymes based on magnesium and calcium
10	6	Enzymes based on manganese
11	7	Monooxygenases based on iron
12	8	Superoxide dismutase based on iron
13	9	Nickel based caronmonooxide dehydrogenase
14	10	Copper oxidases
15	11	Nitrogease enzyme
16	12	Apoptosis of cells by inorganic species and complexes