BIOLOGICAL INORGANIC CHEMISTRY

PROF. DEBASHIS RAY
Department of Chemistry
IIT KGP

PRE-REQUISITES : Coordination Chemistry; Basic Bioinorganic Chemistry

INTENDED AUDIENCE : MSc, MTech and MPharm

INDUSTRIES APPLICABLE TO : BioTech companies; BioProcess companies; Bio Catalyst industries

COURSE OUTLINE :
The extraordinary important role of metal ions in biology, heath, diseases and medicine has become increasingly evident over the last three decades or more. The inorganic aspects of life processes and biological processes can be understood from the viewpoint of the coordination chemistry of metal ions. The study of metal ions in biological systems can only be appreciated from a multidisciplinary approach. It stays within the rapidly growing interface between inorganic chemistry and the living world. It is increasingly recognized that selected metal ions are involved in cellular and subcellular functions.

ABOUT INSTRUCTOR :
Prof. Debashis Ray is an M. Sc. (Gold Medalist) from Burdwan University in 1985 and did his Ph. D.from IACS (degree from Jadavpur University) in 1989 and in faculty roll of IIT Kharagpur from 1990. Specialization: Inorganic Chemistry, Coordination Chemistry, Bioinorganic Chemistry, Analytical Chemistry.Received INSA YS Medal in 1994 and CRSI Bronze Medal in 2007. PHE Dept.

COURSE PLAN :

Week 1**:** Outline of metal ions in biology

Week 2**:** Natural and biological ligands for essential metal ions

Week 3**:** Physical methods to study metal ions biological systems

Week 4**:** Assimilation pathways, transport, storage and homeostasis of biogenic metal ions

Week 5**:** Ion channels and pumps involving sodium and potassium ions

Week 6**:** Magnesium ions for phosphate metabolism and cellular signaling using calcium ions

Week 7**:** Iron ions in life processes: dioxygen management

Week 8**:** Biochemistry of copper ions

Week 9**:** Enzymes containing zinc ions: Action of Lewis acid

Week 10**:** Biological actions of manganese, cobalt and nickel ions

Week 11**:** Nonmetallic species in biology

Week 12**:** Metal ions in brain and medicine