



# INDUSTRIAL INORGANIC CHEMISTRY

**PROF. DEBASHIS RAY**

Department of Chemistry  
IIT Kharagpur

**TYPE OF COURSE** : Rerun | Elective | UG/PG  
**COURSE DURATION** : 12 weeks (24 Jan'22 - 15 Apr'22)  
**EXAM DATE** : 23 April 2022

**INTENDED AUDIENCE:** B. Sc and M. Sc students of Chemistry(Honours), M.Sc. In Pure Chemistry/Applied Chemistry/Analytical Chemistry/Industrial Chemistry

**INDUSTRIES APPLICABLE TO:** Indian Chemical Council; National Peroxide Ltd.; All Chemicals & Fertilizers Companies; All Dyes & Chemicals Companies; BASF India Ltd.; Tata Chemicals Ltd.; Hindustan Unilever Ltd.; Cochin Minerals and Rutile Limited; Union Carbide India Limited; Rashtriya Chemicals & Fertilizers Ltd.; Aditya Birla Chemicals India Ltd.; El Dupont India Pvt. Ltd.; Ultramarine & Pigments Ltd.; Phillips Carbon Black Ltd.;

## COURSE OUTLINE:

Chemical Industries are the prime factors to convert the raw materials into desired products that we use in our day-to-day life. This has brought a tremendous change in the way the things operate. It is very important for us to understand the importance of the chemical industry which has touched all our facets of life. Chemical Industries are the principal areas of any country used to convert the raw materials into desired products that we use in our day-to-day life. This has brought an enormous change in the way the things operate. It is very important for us to understand the importance of the chemical industry which has touched all our aspect of life like agriculture, environ-ment, food, hygiene, catalysis, construction etc.

## ABOUT INSTRUCTOR:

Prof. S. Ramanathan has an M.Sc. (Gold Medalist) from Burdwan University and did his Ph.D. from Indian Association for the Cultivation of Science, Kolkata and in faculty of IIT Kharagpur since 1990. He is skilled and specialized in synthetic and structural coordination, model bioinorganic chemistry, analytical chemistry and coordination triggered self-assem-bles. Recipient of INSA-YS medal, CRSI bronze medal. Visiting fellow in Indiana University, Oxford University and MPI, Muelheim, Germany.

## COURSE PLAN:

**Week 1** : Introduction; Importance of the chemical industry; Primary inorganic materials; Bulk and comodities chemicals; Fine and speciality chemicals; Water and hydrogen; H<sub>2</sub>O<sub>2</sub> and inorganic peroxido compounds.

**Week 2** : Nitrogen and nitrogen compounds; Phosphorus and its compounds; Sulfur and sulfur compounds.

**Week 3** : Halogen and halogen compounds; Applications of iodine and iodine compounds.

**Week 4** : Mineral fertilizers; Nitrogen fertilizers, ammonium nitrate and urea; Phosphorous containing fertilizers.

**Week 5** : Potassium containing fertilizers; Economic importance of fertilizers

**Week 6** : Metals and their compounds; Metallic lithium and its compounds; Metallic sodium, sodium borates; Potassium and its compounds, KOH and K<sub>2</sub>CO<sub>3</sub>.

**Week 7** : Alkaline earth metals and its compounds; Beryllium and magnesium; Calcium, strontium and barium; Manganese, manganese compounds and their applications

**Week 8** : Industry important organo-silicon compounds, industrial silicone products.

**Week 9** : Inorganic solid, zeolites and catalysts, inorganic fibers; Construction materials; Enamel and ceramics.

**Week 10** : Carbon modifications, diamond, graphite, carbonization and graphitization; Glassy and foamed carbon; carbon black.

**Week 11** : Fillers - synthetic and natural, applications; Metallic hard materials.

**Week 12** : Inorganic pigments; TiO<sub>2</sub>, lithopone, ZnS, ZnO and Fe<sub>2</sub>O<sub>3</sub>; Corrosion protection pigments; Luminescent and magnetic pigments; Conclusions.