



INORGANIC CHEMICAL TECHNOLOGY

Prof. Nanda Kishore

Department of Chemical Engineering
IIT Guwahati

INTENDED AUDIENCE: UG Students of Chemical Engineering; Biotechnology; Food Technology ; Textile Engineering

INDUSTRY SUPPORT: All chemical industries, fertilizer industries, pharmaceutical industries, food industries, textile industries, polymer industries, metallurgical industries

ABOUT THE COURSE:

This course is primarily on manufacturing processes of various inorganic chemicals at the industry level. For production of a variety of inorganic chemicals, the basic raw materials requirement, different processes available for the production, flowsheets for such processes, engineering problems associated with such production processes and economics of the processes/materials produced will be discussed. Prior to discussing the production of inorganic chemicals, details of Indian industry along with their current production status and possible improvements discussed in the course. In addition, at the beginning of the course, the discussion of various unit operations and unit processes that form a complete chemical plant, presented in the course.

ABOUT THE INSTRUCTOR:

Prof. Nanda Kishore completed PhD from Indian Institute of Technology (IIT) Kanpur in 2008 and presently is a full professor in the Department of Chemical Engineering of IIT Guwahati, India. He was Brunel Research Fellow from Dec. 21, 2009 to March 31, 2011 at School of Engineering Sciences, University of Southampton, UK. He was a visiting researcher of Department of Chemical and Processing Engineering, University of Surrey, Guildford, United Kingdom from June 2016 to July 2016. He received Young Scientist Research Award in 2016 from DAE-BRNS; IEI Young Engineers Award for the year 2015; Young Scientist Research Grant from Science and Engineering Research Board of Department of Science and Technology, Government of India, 2013.

COURSE PLAN:

Week 1: Principles of Chemical

1. Industries Introduction and Unit Processes
2. Introduction of Unit Operations
3. Unit Operations and Other General Principles
4. General Principles and Chemical Plant Design

Week 2: Fuel and Industrial Gases – 1

1. Fuel Gases
2. Natural Gas, LPG and Syngas
3. Synthesis gas

Week 3: Fuel and Industrial Gases – 2

1. Industrial Gases
2. Industrial Gases – Carbon Dioxide
3. Industrial Gases – Hydrogen

Week 4: Sulfur and Sulfuric Acid

1. Sulfur Industry
2. Sulfur and sulfuric acid
3. Sulfuric Acid

Week 5: Nitrogen Industries

1. Nitrogen Industries – Ammonia
2. Nitrogen Industries – Nitric Acid
3. Nitrogen Industries – Urea
4. Nitrogen Industries – Ammonium Nitrate

Week 6: Phosphorus Industries

1. Phosphorus Industries – Phosphorus and Phosphoric Acid Production
2. Phosphorus Industries – Phosphoric Acid Production by Wet Processes
3. Phosphorus Industries – Phosphates

Week 7: Potassium Industries

1. Potassium Industries
2. Potassium Industries-2

Week 8: Chlor-Alkali Industry

1. Chlor-Alkali Industry – Soda Ash
2. Chlor-Alkali Industry – Chlorine & Caustic Soda

Week 9: Cement, Lime and Glass Industry

1. Cement and Lime Industry – Cement
2. Cement and Lime Industry – Lime
3. Glass Industries

Week 10: Surface Coating Industries

1. Surface Coating Industry
2. Paints and Pigments
3. Varnishes, Lacquers and Industrial Coatings

Week 11: Ceramic Industries

1. Raw Materials and Basic Ceramic Chemistry
2. Whitewares and Structural Clay Products
3. Refractories, Specialized Ceramic Products and Vitreous Enamel

Week 12: Metallurgical Industries

1. Metallurgical Industries - I
2. Metallurgical Industries - II