Syllabus for Industrial Chemistry

Cluster University of Srinagar

Course Code: UG-ICH-18C-401

Course Title: Industrial Chemistry 4 **Credits: 06 (4+2)**

M. Marks: 90 **Contact hours: 64 + 64**

Continuous Assessment: 28+6 **End Term: 56 Marks**

Unit I: Instrumental Analysis (16 Contact hours)

Instrumental Analysis: Principle, Instrumentation and Applications of Chromatographic Techniques: High Performance Liquid Chromatography, Gas Chromatography, Gas Liquid Chromatography and Ion-exchange chromatography. Uses of Chromatographic techniques in pharmaceutical industry, Food and Chemical industries, Forensic sciences and Molecular biology studies.

Unit II: Corrosion and its Control (16 Contact hours)

Introduction, Theories of Corrosion: Dry or Chemical corrosion, Wet or Electro-chemical corrosion. Consequences of corrosion.

Types of Corrosion: Galvanic Corrosion, Concentration Cell Corrosion, Pitting Corrosion, Underground or Soil corrosion, Microbiological Corrosion. Passivity. Factors influencing corrosion: Nature of the metal, environmental factors.

Corrosion Control: Material selection, Proper designing, Use of Inhibitors, Cathodic protection, Anodic protection, Protective coatings.

Unit-III: Protective Coatings (16 Contact hours)

Introduction, Metallic coatings: Anodic coatings, Cathodic coatings, Electroplating (Objectives, Cleaning and Electroplating methods), Electroless plating. Chemical conversion coatings (Phosphate coating, Chromate coating, Chemical oxide coating and Anodized coatings)

Organic Coatings: Paints (requirement of good paints, Constituents of paints, Formulation of paints). Varnishes, Enamels, Lacquers, Emulsion paints, Special paints.

Unit IV: Oils, Fats and Soaps (16 Contact hours)

Introduction, Distinction between Oils and Fats, Properties, Classification of oils, Vegetable oils, Refining of Crude/vegetable oils. Animal oils, Animal fats and oils, Processing of Animal fats and oils. Essential oils (Isolation and Uses). Hydrogenation of oils, Acid value, Iodine value, Saponification value.

Soap: Manufacture, Types of soaps (Toilet soaps, Transparent soaps, Metal soaps).

Oils used for soaps, Cleansing action of soaps.

Lab Course:

Unit V: **(32 Contact hours)**

1. Preparation of Soap.
2. Determination of alkali in soaps.
3. Separation of essential oils by Soxhlet extractor.
4. Determination of Saponification value of an oil.
5. Determination of Viscosity of an oil.

Unit VI: **(32 Contact hours)**

6. Determination of Smoke point of an oil
7. Determination of acid value of oil or fat.
8. Determination of Flash point and Fire of an oil by Pensky-martens flash point apparatus.
9. Determination of Aniline point of an oil.
10. Separate a mixture of o- & p- nitro anilines by column chromatography.

Books Recommended:

1. A textbook of Quantitative Chemical Analysis. Vogel (Edit.), 6th Ed. Pearson Education.
2. Wiley Engineering Chemistry; 2nd Edition-2018.
3. Engineering Chemistry; Jain and Jain, Dhanpat Rai Publishing Company.
4. Industrial Chemistry; B.K. Sharma; Goel Publishing House-Reprint 2013.
5. Handbook of Industrial Chemistry; J.A. Kent, CBS Publishers, New Delhi.
6. Fundamentals of Analytical Chemistry. D.A. Skoog, D.M. West, F.J. Holler, S.R. Crouch, 9th Ed. 2014; Mary Finch, USA.
7. Modern Analytical Chemistry. D. Harvey, McGraw Hill, 2000.
8. Analytical Chemistry; Gary D-Christian; 6 th ed.; Wiley; 2010.
9. Laboratory manual on Engineering Chemistry; S. K.Bhasin, Sudha Rani; D.R.Publishing Company-2015.
10. Practical industrial chemistry, Zeba N. Siddiqui, Anmol publications Pvt. Ltd New Delhi
11. Advanced Practical Inorganic Chemistry; Gurdeep Raj; 24th ed.; Goel Publishing House; 2012.