Course Title: Corrosion Chemistry

Course Code: CH-812

Credit Hours: 3-0

Prerequisite: Nil

Course Objectives

i. To improve comprehension of PG students (i.e. budding future professionals) about corrosion for cogent diagnosis of root cause of corrosion in industries or other technical fields of economy.
ii. To equip students with sound applied knowledge about corrosion control and prevention techniques to preserve industrial installations and national assets.
iii. To prepare manpower for executing research in globally demanding field of corrosion Sciences.

Course Outcomes

At the end of this course, students should be able to understand basic principles of corrosion and its diagnostic cum remediation techniques presented in the course and subsequently their applications to carry out research work in different domains for various applications.

Course Contents

Introduction to Corrosion: Corrosion definition, Causes of corrosion, corrosion drawbacks, importance of corrosion science education. **Fundamentals of Corrosion Thermodynamics and Kinetics:** Gibbs Free Energy, Electrode Potential, Reference Electrodes, Galvanic Cell, Emf and Galvanic Series, Nernst Equation, Differential Aeration Concentration Cell, Liquid Junction Potentials, Calculation of Corrosion Rates. **Corrosion in Different Environments:** Atmospheric Corrosion, Water Corrosion and Soil Corrosion, Corrosion in Boiler. **Forms of Corrosion:** Uniform Corrosion, Galvanic Corrosion, Concentration Cell Corrosion, Pitting Corrosion, Crevice Corrosion, Filiform Corrosion, Intergranular Corrosion. **Corrosion Control:** Design, Material Selection, Protective Coatings, Inhibitors, Electrochemical Protection. **Corrosion Testing:** Testing Methods, Electrochemical Testing, Cathodic Protection Monitoring.

Recommended Books

1. Shreir's Corrosion (Vol 1 to 4) by Elsevier Ed.2009, ISBN: 9780444527882.
2. Electrochemistry and Corrosion Science by Nestor Perez Ed.2016, ISBN 978-3-319-24847-9.

3. Analytical Methods in Corrosion Science and Engineering by Philippe Marcus and Florian Mansfeld Ed.2009, ISBN 9780824759520.
4. Principles of Corrosion Engineering and Corrosion Control by Zaki Ahmad Ed.2009, ISBN: 9780750659246.