SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Surface Coating Technology)
Semester: IV
Syllabus with Effect from: June - 2015

Paper Code: PS04CSCT07	Total Credit: 4
Title Of Paper: Corrosion Technology & Heavy Duty Protective Coatings	

Unit	Description in Detail	Weightage (%)
I	Corrosion Science, Engineering and Technology:- corrosion damage and cost of corrosion; functional and economic aspects of corrosion; classifications of corrosion processes; corrosion quantification and corrosion rate expressions; electrochemical aspects to affect corrosion rate - polarization and passivity; environmental factors to affect the corrosion rate.	15 %
II	Practical forms of corrosion (in practice) Uniform corrosion, Non-uniform/localized attack (i) Galvanic/Bimetallic (ii) Crevice & Filiform (iii) Pitting (iv) Inter granular corrosion (v) Selective leaching-dezincification & graphitization (vi) Erosion corrosion - impingement attack, cavitation damage, fretting corrosion (viii) Stress corrosion cracking & corrosion fatigue	25 %
III	Miscellaneous-Hydrogen damage, radiation damage, caustic embrittlement. (a) Corrosion under various conditions : atmospheric corrosion; underground corrosion- natural soil, stray current, biological corrosion; immersion corrosion; marine corrosion, liquid metal corrosion, aerospace, electronic equipments, dew point corrosion, high temperature corrosion. (b) Corrosion in industries: chemical industries- pulp & paper, fertilizer, paint manufacture & application industries; petroleum refineries and petrochemical industries; building industry and rebar corrosion; boiler plants; automobile industry; nuclear power plants. (c) Corrosion testing: Destructive and non-destructive methods; physico-chemical methods-immersion, humidity, salt spray; special property tests for SCC, IGC etc.; electrochemical methods-E-I curves/Evans diagrams/polarization diagrams; electrode potential measurements, impedance measurement, electronic instrumentations, NACE test methods; (d) Corrosion Inhibition	20 %
IV	Technology of Heavy Duty Protective Coatings:- Basic requirements of HDPC, Blasting, Coverage, Dry film Thickness, Chemical bondage criteria in 2K epoxy, Epoxy-Coal Tar, Epoxy Ester coatings, 2K Polyurethane Pigmented coatings, Tape Coatings, Chlorinated Rubber Paints, Zinc rich Coatings. HDPC for structures in corrosive environments. Technology of Marine Coatings:- Anticorrosive Primers, Zinc Chrome & Red Lead based Boot-Top Paints. Anti Fouling Paints- Soluble & Insoluble matrix, Self Polishing, Copper complex based.Paints for Super structures & Harbour Installation. Testing of Marine Paints as per IS: 1470, 1419.	40 %

Basic Text & Reference Books:-

- Surface coating Technology Vol II, OCCA, Chapman and Hall, London & New York.
- "Paints and surface coatings -Theory & Practice", 2nd ed., R. Lambourne & T.A. Stevens, William Andrew Publishing, 1999.
- Protective Coatings for Metals, E.J. Vaughan & J.W. Gailer
- Protective Paint coatings for metals, Fraunhofer and Boxall, Particullis Press Ltd, 2 Queensway, Surey, England.
- Organic Coatings, Science and Technology, vol 2, WICKS.
- Basics of Paint Technology, Vol I, 1st ed., V.C. Malshe, 2000
- Corrosion and corrosion protection handbook, by Philip A. Schweitzer (Ed.), Marcel Dekker c.
- Corrosion and corrosion control by H.H.Uhlig & R.V.Revie Wiley-Interscience