

**SARDAR PATEL UNIVERSITY  
VALLABH VIDYANAGAR**



**Programme & Subject: M.Sc (Surface Coating Technology)  
Syllabus with Effect from: 2018-19  
Semester: IV**

<b>Paper Code: PS04CSCT21</b>		<b>Total Credit: 4</b>
<b>Title Of Paper: Technology of Resins for Surface Coating - II</b>		
<b>Unit</b>	<b>Description in detail</b>	<b>Weightage (%)</b>
I	Chemistry and Technology of Synthetic resins viz. Polyamides, Epoxy, Polyurethanes, Silicone resin, Chlorinated Rubber: Raw materials for these resins, Chemistry of synthesis of these resins, processing techniques, properties & applications of these resins for surface coatings.	90 %
II	Chemistry and Technology of Cellulosic film formers e.g. Nitrocellulose and CAB.	10 %

**Basic Text & Reference Books:-**

- Surface Coatings – Raw Materials & Their Usage, OCCA-VOI I “Chapman and Hall”, NY, 1993.
- Resins for surface coatings, Vol I, II & III, P.K.T. Oldring, SITA Technology
- Resins for coating: Chemistry, Properties and Applications, 1<sup>st</sup> ed, Stoye D, Hanser Publishers, 1996.
- “Organic coatings, Science & Technology” Vol I, Wicks, Wiley Interscience Pub. Ltd, 1992.
- The Chemistry of Organic Film Formers, Soloman, D.F. Wiley, New York.
- Surface coatings: Science & Technology, Swaraj Paul. 2<sup>nd</sup> ed., John Willey & Sons, 1996
- Surface coatings Vol 1 to 3 WILSON, 1<sup>st</sup> ed, Elsevier Applied Science, 1986
- The Technology of Paints, Varnishes & Lacquers, 1st ed., C.R. Martens, Roberts E Kniger Pub. Co-Oprat, 1974.
- Epoxy Resins- Chemistry and Technology, 2<sup>nd</sup> ed, MAY,1988.

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<b>Paper Code: PS04CSCT22</b>		<b>Total Credit: 4</b>
<b>Title Of the Paper: Corrosion Technology &amp; Heavy Duty Protective Coatings</b>		
<b>Unit</b>	<b>Description in detail</b>	<b>Weight age (%)</b>
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)  I. Uniform corrosion, II. 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

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<b>Paper Code: PS04CSCT23</b>		<b>Total Credit: 4</b>
<b>Title Of Paper: Coating Application &amp; Specialty Coatings</b>		
<b>Unit</b>	<b>Description in detail</b>	<b>Weightage (%)</b>
I	Techniques of Surface Preparation: Need for Surface Preparation; Manual and Mechanical methods of Surface Preparation, e.g. Sand blasting and Flame clearing; Conversion Coatings and Pretreatment Chemicals for Ferrous and Non-Ferrous Substrate; Surface Preparation for Plastic Substrates; Rust Converters	30 %
II	Techniques of Paint Application: Brushing, dipping, conventional spray, Air less spray, electrostatic spray, Bell applicator, electrodeposition coating, vacuum impregnation, Curtain coating and roller coatings	40 %
III	Study of Coil Coating, UV cured coating, Waterborne PU Coatings, Non Stick coatings, Smart Coatings, Hygienic Coatings	30 %

**Basic Text & Reference Books:-**

- Organic Coatings - Applications, Properties & Performance, Vol II, Wicks Z. W., wiley interscience pub.ltd., 1992.
- Protective Paint coatings for metals, Fraunhofer and Boxall, Particullis Press Ltd, 2 Queensway, Surey, England.
- Surface coatings: Vol II: Paints & Their Applications, 2<sup>nd</sup> ed., OCCA, Chapman and Hall, 1984.
- “Paints and surface coatings -Theory & Practice”, 2<sup>nd</sup> ed., R. Lambourne & T.A. Stevens, William Andrew Publishing, 1999.
- The Technology, Formulation & Application of Powder coatings Vol I, Howell David M, John Willey, 2000.
- Phosphating of Metals, RAUSH.
- Automotive Paints and Coatings, Hans-Joachim Streitberger & Karl-Friedrich Dossel,2008
- Paint Technology Handbook, Rodger Talbert, 2007

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<b>Paper Code: PS04CSCT24</b>		<b>Total Credit: 8</b>
<b>Title Of Paper: Practical: Project</b>		
<b>Unit</b>	<b>Description in detail</b>	<b>Weightage (%)</b>
	Practical: A project report based on literature survey and laboratory work conducted on topics related to Surface Coating Technology and/or chemistry is to be submitted and presented as a seminar by each student	100 %

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<b>Paper Code: PS04ESCT21</b>		<b>Total Credit: 4</b>
<b>Title Of Paper: Marketing Management</b>		
<b>Unit</b>	<b>Description in detail</b>	<b>Weightage (%)</b>
I	<p>Basic concepts of marketing, Product, Price, Promotion and Distribution            Functions of Marketing Management</p> <p>Building customer satisfaction, strategic planning, marketing planning,            MIS and marketing research, consumer behavior, marketing mix, business            and competition analysis</p> <p>Brand Management, Sales Promotion and Public Relations</p> <p>Product Planning and Development, Product Life Cycle</p> <p>Performance Evaluation of Marketing Programmes, global marketing,            Rural Marketing, Industrial Marketing</p> <p>Distributor Network: Importance &amp; Management</p> <p>Export Management – Importance, Promotion, Procedure and Problems            Demand forecasting: Long and short term demand forecasting methods.            Regression Analysis and smoothing methods; Estimation of trend, cycle,            seasonality components; Analysis of forecast error and computer control of            forecasting systems</p>	100 %

**Basic Text & Reference Books:-**

- Marketing Management by Philip Kotler.
- Industrial Engineering & Management by: O.P.Khanna.
- Marketing Management: Rajan Nair, J.C. Gandhi.
- Managerial Economics by Peterson & Lewis

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<b>Paper Code: PS04ESCT22</b>		<b>Total Credit: 4</b>
<b>Title Of Paper: Environmental Management</b>		
<b>Unit</b>	<b>Description in detail</b>	<b>Weightage (%)</b>
I	Concept of Green Chemistry & Technology Introduction to environmental Legislations pertaining to paint & coating industries Basic Environmental Chemistry Management of water pollution, air pollution & hazardous waste Advanced technologies for environmental management Cost benefit analysis of pollution abatement Energy Conservation & renewable resource of energies ISO standards for Environmental Management	100 %

**Basic Text & Reference Books:-**

- Green Chemistry: Theory and Practice, Paul T. Anastas and John C. Warner. New York: Press, 1998.
- Wastewater Engineering: Treatment, Disposal, Reuse by Metcalf & Eddy, Tata McGraw, New Delhi
- Basic Environmental Engineering, by R C Gaur
- Environmental Engineering, 6<sup>th</sup> ed, [Nelson L. Nemerow](#) (Editor), [Franklin J. Agardy](#) (Editor), [Joseph A. Salvato](#) (Editor) by John Wiley & Sons, Inc.
- Handbook of chemical and environmental engineering calculations, by Joseph P Reynolds, John S Jeris, Louis Theodore, John Wiley & Sons, Inc.
- Air Pollution by M N Rao, McGraw, New Delhi
- Environmental Chemistry by A K De, Wiley Eastern Ltd
- Non-Conventional Energy Sources by G.D.Rai