

## SEMESTER-VIII

### DISCIPLINE SPECIFIC CORE (DSC-20)

#### Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/Practice		
Paints, Coatings, and Adhesive	4	2	0	2	12 <sup>Th</sup> with PCM	---

#### COURSE OBJECTIVES:

1. To learn about of basics of paints, coatings and adhesive technology and their applications
2. To gain knowledge of formulations of various types of paints, coatings and adhesives

#### LEARNING OUTCOMES:

After studying this paper, students will be able to

1. Make formulations of various types of paints, coatings and adhesives for desired applications
2. Evaluate quality assessment of paints, coatings and adhesives
3. Understand the challenges and scope of paints, coatings and adhesives industry

#### THEORY:

(30 Hours)

#### UNIT 1: INTRODUCTION TO PAINTS, COATINGS AND ADHESIVES (5Hours)

General information about paint, paint composition, types of paints: wall, industrial, automobile, Corrosion resistance and flame retardants. Function and properties of paints, Types of adhesives: structural, elastomeric and pseudo plastic

Definition and importance of coating.challenges and future scope of paints, coatings and adhesives industry

#### UNIT 2: PREPARATION OF PAINTS, COATINGS AND ADHESIVES (10 Hours)

Preparation and compounding ingredients of paints, coatings and adhesives. Formulations, selection and water solubility, manufacturing and uses of paints, coatings (manufacture, criteria and type), adhesive (manufacturing of structural and elastomeric), manufacturing equipment's: high-speed mixers, mill (vertical, horizontal, continuous, sand mill and ball mill)

#### UNIT 3: COATING OPERATIONS (7 Hours)

Coating operations: brush, roller, both side roller, spray (manual/airless/air guns), dip coating (advantages & limitations), flow coating

#### UNIT 4: TESTING OF PAINTS COATINGS AND ADHESIVES (8 Hours)

Color and appearance, adhesion, scratch resistance, chemical resistance, wet ability, Thickness, Hardness, weathering, abrasion resistance, viscosity, UV resistance, corrosion resistance etc.,

## **PRACTICALS: (60 Hours)**

- Prepare paints (water and solvent-based) and determine the physical properties. i.e. drying time, spreadability, solid content.
- Evaluate adhesive strength by peel test method.
- Prepare adhesive of different formulations.
- Measure the wettability/flowability of adhesives.
- Measure the resin/paint viscosity by Ford cup 4 and Brookfield viscometer.
- Test the film hardness of a coated adhesive film.
- Measure the scratch resistance of painted films.
- Calculate weight percent of paint in a painted film.
- Analyze humidity content of painted films.
- Analysis of paints film by pencil hardness test
- Preparation of coatings by different solvents and medium
- Determination of color, drying time, non -volatile content of coatings.
- Analyse electrical resistance, chemical resistance, durability and thermal resistance of adhesive films.

## **ESSENTIAL/RECOMMENDED READINGS**

1. Morgan W.M., (2000) Outline of Paint Technology, CBS Publisher.
2. StoyeD.,andW.Freitag, (2008) Paints, Coatings and Solvents, Wiley-VCH.
3. Talbert R., (2008) Paints Technology Handbook, CRC Press.
4. Pocius A.V. (2021) Adhesion and Adhesives Technology, Hanser-Verlag

## **ADDITIONAL RESOURCES:**

1. Ryntz R.A., Yaneff P.V., (2003) Coatings of polymers and plastics, Marcel Dekker.
2. Mittal K.L., (2003) Adhesion aspects of polymeric coatings, VSP.
3. Kondekar N.R., A window to paints and coatings technology by colour publications Pvt. Ltd.
4. Arthur A. Tracton.(2006),Coatings Technology: Fundamentals, Testing, and Processing, Taylor and Francis.
5. Board, N. R. (2023). Modern technology of paints, varnishes & lacquers. Asia Pacific Business Press Inc.

## **ASSESSMENT METHODS:**

All the examinations and assessment methods shall be in the line with the University of Delhi guidelines issued from time to time

## **KEYWORDS:**

Structural adhesives, Wettability, Dip coating, Paints, Surface treatments