

7 th Semester	RPR7D002	Surface Engineering	L-T-P 3-0-0	3 Credits
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Module I:**(10 Hours)**

Mechanisms of Wear and Metal Cleaning: Basic Mechanisms of wear-abrasive, adhesivewear, contact fatigue, Fretting corrosion, Testing of wear resistance, practical diagnosis of wear, general cleaning process for ferrous and non-ferrous metals and alloys selection of cleaning processes, alkaline cleaning, emulsion cleaning, ultrasonic cleaning, pickling salt bath descaling, abrasive bath cleaning, polishing and buffing shot peening.

Module II:**(10 Hours)**

Thermal Spraying Processes and Electrodeposited Coatings: Thermal spraying materials, characteristics of thermal spray processes, Design for thermally sprayed coatings coating production, spray fused coatings, Principles of electroplating, Technology and control-electroplating systems, Properties and applications of electrodeposits, Non aqueous and electroless deposition, plasma coating.

Module III:**(12 Hours)**

Hot Dip Coating and Diffusion Coating: Principles, Surface preparation, Batchcoating and continuous coating process, Coating properties and application, Principles of cementation, Cladding-vacuum deposition, Sprayed metal coating, Structure of diffusion coatings, Chemical vapour deposition (CVD), Physical vapour deposition (PVD). [06] Non-Metallic Coating Oxide and Conversion Coatings: Plating coating, lacquers, rubbers and elastomers, vitreous enamels, anodizing Chromating, application to aluminium, magnesium, tin, zinc, cadmium copper and silver, phosphating primers.

Module IV:**(06 Hours)**

Quality Assurance, Testing and Selection of Coatings: The quality plan, design, testing and inspection, thickness and porosity measurement, selection of coatings, industrial applications of engineering coatings.

Books:

- [1] Engineering Coatings-design and application- S. Grainger, Jaico Publishing House.
- [2] Principles of Metals surface treatment and protection- D. R. Gabe, Pergamon.
- [3] Advances in surface treatment- Niku-Lavi, Pergamon.
- [4] Electroplating Handbooks- N.V.Parathasarathy, Prentice Hall.

Digital Learning Resources:

Course Name:	Technology of Surface Coating
Course Link:	https://nptel.ac.in/courses/112/105/112105053/
Course Instructor:	Prof. A.K. Chattopadhyay, IIT Kharagpur
Course Name:	Fundamentals of Surface Engineering: Mechanisms, Processes and Characterizations
Course Link:	https://nptel.ac.in/courses/112/107/112107248/
Course Instructor:	Dr. D. K. Dwivedi, IIT Roorkee