

Surface Engineering

3 Credits (3-1-0)

Introduction: Role of surface on various Engineering phenomena, Technological properties of surfaces, Need for modification of surfaces.

Tribology: Surface dependent engineering properties, viz., wear, friction, corrosion, fatigue, reflectivity, emissivity, etc.; common surface initiated engineering failures; mechanism of surface degradation; importance and necessity of surface engineering; classification and scope of surface engineering in metals, ceramics, polymers and composites, tailoring of surfaces of advanced materials.

Characterization Techniques: Film Thickness Measurements Using Optical Techniques, Corrosion Testing of Coatings, Evaluation of Mechanical Properties of Thin Films, Microstructural Characterization of Coatings and Thin Films, Wear and Erosion Testing of Coatings.

Plating Processes: Fundamentals of electroplating, Electrodeposition from plating baths, Electroless plating, Metallizing, Selective plating, Hard anodizing, Other plating processes, Applicability of plating for wear resistance

Surface Coatings: Dip, Barrier and Chemical conversion coatings, Vacuum and controlled-atmosphere coating

Books and References:

1. Friction and Wear of materials/ Ernest Rabinowicz/John Wiley & Sons 2008
2. Kenneth G Budinski. "Surface Engineering for Wear Resistance". Prentice Hall Inc. Englewood Cliffs, New Jersey. USA 1988
3. Engineering Tribology/Amandeep Singh Wadhwa/Shalom Akhai/Dhanpat Rai & Co. 2012
4. "Surface Engineering of Metals: Principles, Equipment, Technologies/adeusz Burakowski/Tadeusz Wierzchoń"/CRC 1998