

MSE-851 Surface Engineering and Characterization – 3 CHs

Prerequisite - Nil

Category: Core Course

Existing Course Contents	Proposed Changes
<ul style="list-style-type: none"> • Elements of material surface interactions, surface tension, Young's sessile drop model, • Particle surface interactions, surface analysis by ions, electrons and photons, • Physical vapor deposition, Chemical vapor deposition • Application of laser and Plasma for surface modification, • Characterization of coatings for surface hardness, wear resistance, • Adhesion and microstructure, Coatings for corrosion resistance, • Aesthetic appearance, optical and electronic applications, • Electroplating, Electro-less Deposition. 	<p>Course contents:</p> <ul style="list-style-type: none"> • Elements of material surface interactions, surface tension, Young's sessile drop model, • Surface Pre-treatments. • Surface Analysis: Profilometry, AFM, STM, • Surface Modifications (Surface roughening, Grit Blasting, Evaporation, Activated Evaporation) & Heat treatment • Applications of Surface Engineering: High Temperature Coatings, Thermal spray coatings, Corrosion resistance coatings, Hard chrome coatings, Electroplating. • Characterization of coatings for surface hardness, wear resistance, • Adhesion and microstructure, Coatings for corrosion resistance, • Aesthetic appearance, optical and electronic applications, • Electroplating, Electro-less Deposition.

Proposed Weekly Plan for the Concerned Faculty

Week / Lecture	Topic
1	Elements of material surface interactions, surface tension, Young's sessile drop model,
2,3	Surface Pre-treatments.
4,5	Surface Analysis: Profilometry, AFM, STM, Surface Modifications (Surface roughening, Grit Blasting, Evaporation, Activated Evaporation) & Heat treatment
6-9	Applications of Surface Engineering: High Temperature Coatings,

	Thermal spray coatings, Corrosion resistance coatings, Hard chrome coatings, Electroplating.
10,11	Characterization of coatings for surface hardness, wear resistance,
12,13	Adhesion and microstructure, Coatings for corrosion resistance,
14,15	Aesthetic appearance, optical and electronic applications,
16,17	Electroplating, Electro-less Deposition.