

SYLLABUS :-

Prerequisite - Nil Surface dependent engineering properties, viz., Friction and wear, corrosion, fatigue, 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. Surface protection (Physical); surface modification (Chemical) techniques: classification, principles, methods, and technology. Conventional surface engineering methods: carburising, nitriding, cyaniding, diffusion coating, hot dipping, galvanizing etc. Electrochemistry and electro-deposition; scope and application of conventional surface engineering techniques in engineering materials; advantages and limitations of conventional processes. Recent trend in surface engineering: physical/chemical vapor deposition; plasma spray coating; plasma assisted ion implantation. Surface modification by directed energy beams like ion, electron and laser beams; energy transfer, novelty of the directed energy beams assisted surface modification techniques. Characterization (microstructural and compositional) and testing/evaluation of surface-properties; structure-property correlation. Economics and energy considerations, designing of surface engineering processes. Text Books: 1.J. R. Davis (Ed.): Surface Engineering for Corrosion and Wear Resistance, ASM International, Materials Park, Ohio, 2001. 2.K. G. Budinski (Ed.): Surface Engineering for Wear Resistance, Prentice Hall, New Jersey 1988.