

MSE 474 Surface Engineering of Materials (3 CH)

Pre-requisites: None

Course Objectives

1. Surface Engineering is an interdisciplinary and engineering field that covers thin films fabrication, investigation of their performances, designs, analyses, characterization and applications of engineering surfaces.

Course Contents

2. 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.

Course Outcome:

3. Once the semester is over, the students would be able to:
- a. Effectively describe any surface in terms of its crystal structure and physical properties
 - b. Explain the importance and relevance to different modification techniques to certain applications
 - c. Describe salient features of various surface modification techniques
 - d. Suggest ways to change/modify surface using thin film deposition techniques
 - e. Explain working principle and interpret information obtained using surface analysis techniques

Suggested Books

1. J. B. Hudson, Surface Science: An Introduction, John Wiley and Sons, Inc. (1998)
2. W. D. Sproul, K. O. Legg, Opportunities for Innovation: Advanced Surface Engineering, Taylor & Francis, (1994)