6th Semester		Surface Science	L-T-P 3-0-0	3 CREDITS

Module I: **(8 Hours)**

Importance surface engineering; classification of surface engineering processes; substrates and their pre-treatments; Coating characteristics: coating thickness, continuity, hardness, adhesion, porosity, and bond strength

Module II: **(10 Hours)**

Thermally Sprayed Coatings: Plasma spraying; flame spraying, detonation spray coating, High velocity oxy-fuel spraying; thermal barrier coatings. Factors influencing thermal spray coatings.

Module III: **(6 Hours)**

Diffusion Coatings: Process fundamentals, advantages, limitations and applications of carburizing, liquid nitriding, carbonitriding, nitrocarburizing, and boronizing. Aluminized, chromized, and siliconized coatings.

Module IV: **(14 Hours)**

Thin Film Coating: Chemical Vapor deposition (CVD); Physical Vapor Deposition (PVD); Electron beam evaporation; magnetron sputtering; Plasma carburizing and plasma nitriding;

Surface characterization: Thickness, bond strength and porosity measurement; hardness, wear resistance and corrosion resistance.

Books:

[1] ***Surface engineering of metals***, T Burakowski and T. Wierzchon, CRC Press

[2] ***Materials degradation and its control by surface engineering***, A. W. Batchelor, L. N. Lam and M. Chandrasekaran, Imperial college press

[3] ***Engineering coatings***: S Grainger and J. Blunt, William Andrew Publishing