7th Semester	RMM7D002	Tribology of Engineering Materials	L-T-P 3-0-0	3 Credits

Module I: **(10 Hours)**

Surface properties and surfaces in contact: Nature of metallic surface, surface geometry, measurement of surface topography, quantifying surface roughness, contact between surfaces; Friction, the laws of friction, measurement of friction, origin of friction, theories of friction adhesion- theory, extension of the adhesion theory

Module II: **(10 Hours)**

Wear: Types of wear, adhesive wear, Archard's law, abrasive wear, erosion wear, factors affecting corrosive wear, wear map, various wear testing methods- pin on disc, pin on drum, slurry wear, air jet and water jet erosion as per ASTM standards

Module III: **(10 Hours)**

Tribological properties of solid materials: Hardness, strength, ductility and work hardening rate, effect of crystal structure, effect of microstructure, mutual solubility of rubbing pairs and effect of temperature

Module IV: **(10 Hours)**

Surface treatments to reduce wear: Surface treatments with or without change of composition, surface coating- welding, flame, spraying, plasma spraying, electroplating and electroless coating, chemical vapour deposition (CVD) and physical vapour deposition (PVD), super hard coatings

Books:

[1] Hutchings I.M., Tribology – Friction and wear of engineering Materials, Edward Arnold,
[2] Arnold R.D., Davies P.B., Halling J. and Whomes T.L., Tribology – Principles and Design Applications, Springer Verlag
[3] Bhushan B., Introduction to Tribology, John Wiley, 2002
[4] Stachowiak G and Batchelor A.W., Engineering Tribology, 4th Ed. Elsevier Butterworth-Heinemann, 2013