



ME255 Aug 3:0

Principles of Tribology

Instructor

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Teaching Assistant

Email:

Department: Department of Mechanical Engineering

Course Time:

Lecture venue:

Detailed Course Page: http://www.mecheng.iisc.ernet.in/~bobji/funtri/me_255.html

Announcements

Brief description of the course

This course looks at the friction, wear and lubrication from the fundamental view point. It deals with Surface properties, Contact mechanics, Characterisation techniques, theories of friction and its mechanisms, various types of wear and lubrication

Prerequisites

none

Syllabus

Introduction: History, Interdisciplinary, Surfaces and Interfaces,

Surface Properties: Geometrical “ Atomic nature, Surface generation, Roughness, “Smooth Surfaces”.

Physical, Material and Chemical Properties Measurement techniques, Adsorption

Surface-surface Interactions Hertzian contact, Point load, Sliding, Stick “Slip, Plasticity , Asperity contacts,

Void, crack nucleation and propagation

Friction – Theories – genesis- mechanisms

Wear – Theories, Sliding, Abrasion, Erosion – Fatigue, Fretting

Surface-Liquid Interactions : Contact angle, Long range Forces, Monolayers, Confined Liquids

Surface-Liquid-Surface Interactions: Viscosity, Lubricants- Composition - additives, Hydrostatic, hydrodynamic, elasto-hydrodynamic lubrication.

Course outcomes

An appreciation of the Tribological concepts as an application of Physics, chemistry and mechanics.

Grading policy

Typically

50% for 2 assignments (one involving presentation), 1 mid-term test and 1 experimental project

50% for final exam

Assignments

Resources

Available at

<http://www.mecheng.iisc.ernet.in/~bobji/funtri/books.html>

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