

TRIBOLOGIE : PRINCIPES ET APPLICATIONS

TRIBOLOGY

 Lecturers:
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 | Lecturers : 16.0 | TC : 0.0 | PW : 8.0 | Autonomy : 0.0 | Study : 4.0 | Project : 0.0 | Language : MI

Objectives

About 25% of the energy consumed by mankind is lost in contact between moving surfaces. This figure shows that understanding the tribological phenomena of friction, lubrication and wear is necessary to meet the technological challenges of sustainable production and the reliability of consumer goods or energy frugality. At the crossroads of mechanics, physics and chemistry of materials, this course gives the principles and methods of surface engineering used in tribology to design complex interfaces in biological implants, mechanical assemblies of propulsion and power transmission or manufacturing processes.

Keywords : Friction, lubrication, surface engineering, contact mechanics, materials science

Programme	 I. The mechanics of static contacts: Contact between smooth and rough surfaces, Role of thin solid films and coatings II. Macroscopic laws of friction and wear: Static and kinetic friction, Physics of friction and wear III. Surfaces and lubricants: Adhesive contacts, Structure and properties of lubricants and additives IV. Thin film lubrication: Experimental and computational hydrodynamics, Elastohydrodynamic lubrication in high-pressure contacts V. Boundary lubrication: Control of friction and wear, Nanotribology and molecular
Learning outcomes	 To analyse an industrial problem in tribology and to propose a dignosis To characterize features of rough urfaces and liquid lubricants as they pertain to interface sliding. To suggest solutions for suitable applications based on improved materials selection, use of tribological coatings, improved desgin or lubrication. To apply the basic theories of friction, wear and lubrication to predictions about the tribological behavior of commonly encountered sliding interfaces.
Independent study	Objectifs : This activity is not concerned with framed autonomy activities outside personal work.
	Méhodes : This activity is not concerned with framed autonomy activities outside personal work.
Core texts	G.W. Stachowiak, A.W. Batchelor, <i>ENGINEERING TRIBOLOGY</i> , Butterworth - Heinemann, 2014 I.L. Singer, H. M. Pollock <i>FUNDAMENTALS OF FRICTION: MACROSCOPIC AND MICROSCOPIC</i> <i>PROCESSES</i> , Springer Netherlands, 1992 F.P. Bowden, D. Tabor <i>FRICTION AND LUBRICATION OF SOLIDS</i> , Oxford University Press, 1954
Assessment	Final mark = 2/3 Knowledge + 1/3 Know-how > Knowledge N1 = 100% final exam > Know-how N2 = 100% continuous assessment