

UE Adhesion, friction and direct bonding



Niveau d'étude
Bac +5



ECTS
3 crédits



Composante
UFR PhITEM
(physique,
ingénierie, terre,
environnement,
mécanique)



Période de
l'année
Automne (sept.
à dec./janv.)

- > Langue(s) d'enseignement: Anglais
- > Ouvert aux étudiants en échange: Oui
- > Code d'export Apogée: PAX9NFAF

Présentation

Description

Goal: Nanomechanics is an important part of applied nanotechnology, This course will provide a working knowledge of nano-mechanics and nano-tribology emphasizing the role of surfaces, interfaces, defects, roughness, and quantum effects. Nano-mechanical measurements techniques and applications in micro-electronic technologies and nano-manufacturing will be developed.

I. Overview and preliminaries.

Surface interactions ; Van der Waals long range forces ; Derjaguin approximation, measuring surfaces forces SFA AFM.

II. Mechanics of solid contacts.

Single contact: Herz contact ; mechanics of adhesive contacts.
Statistics of contacts: Greenwood-Williamson model ; elasto-plastic contact

III. Friction an lubrication

Amonton's law and Coulomb friction ; Tabor 's model of friction. Static and dynamic friction ; stick-slip ; Rice and Ruina law's of friction. Lubrication regimes, Reynolds equation, squeeze film lubrication. Exercice class.

IV. Applications in micro-electronics

MEMS & NEMS applications
Mechanics of fracture ; smartcut process

Direct bonding, wetting ; bonding wave dynamics

Heures d'enseignement

UE Adhesion, friction and direct bonding - CMTD

Cours magistral - Travaux dirigés

22,5h

Période : Semestre 9

Infos pratiques

Lieu(x) ville

› Grenoble

Campus

› Grenoble - Domaine universitaire