ME-620

Mechanics of dislocations

Curtin William

Cursus	Sem.	Type
Mechanics		Opt.

Language of teaching	English
Credits	4
Session	
Exam	Term paper
Workload	120h
Hours	**56**
Lecture	42
Exercises	14
Number of positions	**20**

Frequency

Only this year

Remark

Prerequisite: Good background in Continuum Mechanics at the level of ME-331; ME-437 would also be helpful; this course will start with a review of key background; ME-414 would be a complem

Summary

The course introduces dislocation defects, which are the carriers of plastic deformation in crystalline materials. Dislocations will be studied from both continuum and atomistic perspectives, and making connections to macroscopic plastic behavior with a focus on metal alloys.

Content

Topics that are planned to be covered:

Review of Solid Mechanics principles
Defining the dislocation
Stress and Strain fields of straight dislocations
Dislocation Loops
Dislocation Interactions
Line Tension concept
Dislocation Mobility Laws
Peierls-Nabarro model of the dislocation core
Dislocation reactions and junction formation/destruction
Dislocations in different crystal structures - role of the atoms
Cross-slip
Strengthening mechanisms: solutes and precipitates

Learning Prerequisites

Required courses

ME-331 (Solid Mechanics) or equivalent

Recommended courses

ME-437 (Advanced Solid Mechanics)