



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Thermal Transport Down to the Nanoscale

2324-116R-M05

Title

Thermal Transport Down to the Nanoscale

Teacher(s)

Carlo Antonini

Language

English

Short description

Course description

The course aims to present heat transfer and related energy conversion phenomena, spanning from a macroscopic perspective down to the micro- and nano-scale. In the first part of the course, the fundamental classical laws (i.e. Fourier Law) will be presented, discussing their limits of validity and the size effects. In the second part of the course, engineered devices, such as heat pipes, and thermal management strategies and challenges will be presented.

Content

- Intro: Macroscopic theory of heat transfer, microscopic picture, micro and nano scale transport phenomena
- Particle description of Transport Processes: classical laws
- Classical laws + Classical size effects
- Classical size effects
- Energy conversion and couples transport processes
- Liquids and their interfaces: liquid transport properties, size effect in single-phase flow and phase transition
- Multiphase transport devices: Heat pipes and applications
- Thermal management applications: electronics, batteries and electric vehicles, space

CFU / Hours

16 hours

Teaching period

April-May 2024

Sustainable Development Goals

AFFORDABLE AND CLEAN ENERGY
