



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Thermal Transport Down to the Nanoscale

2324-116R-M05

---

#### Titolo

Thermal Transport Down to the Nanoscale

#### Docente(i)

Carlo Antonini

#### Lingua

English

#### Breve descrizione

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 / Ore**

16 hours

## **Periodo di erogazione**

April-May 2024

## **Sustainable Development Goals**

ENERGIA PULITA E ACCESSIBILE

---