



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Thermal Transport down to the Nanoscale

2425-116R-M02

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#### 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

## Part I

- Intro: Macroscopic theory of heat transfer (conduction, convection, radiation), microscopic picture, micro and nano scale transport phenomena
- Particle description of Transport Processes: classical laws
- Classical laws
- Classical size effects

## Part II

- Overview of thermal management techniques
- Thermal management using heat pipes
- Thermal management in space
- Thermal transport in nanocomposites

## **CFU / Hours**

16 hours

## **Teaching period**

October 2025

## **Sustainable Development Goals**

AFFORDABLE AND CLEAN ENERGY

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