UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

## Modeling and Simulation

**2324-4-H4102D024-H4102D088M**

### Aims

To provide the concepts necessary for understanding cardiovascular fluid-dynamics.

### Contents

The lessons cover the most important aspects related to cardiovascular fluid-dynamics (continuity and conservation laws. pressure drops, viscosity, shear stress) and the lumped parameter modeling of blood flow in vessels. Students will acquire the basic knowledge regarding the mathematical description of blood flow in vessels and the role of physical parameters.

### Detailed program

1. Basic concepts of blood fluid-dynamics in vessels.
2. Properties of blood and vessels.
3. Pressure drop and viscosity.
4. Shear stress.
5. Laws of mass conservation, momentum and energy balance.
6. Lumped parameter description of blood flow.
7. Pulsatile blood flow.

### Prerequisites

Basic knowledge of fundamentals of biology, morphology and physiology of the cardiovascular system.

## Teaching form

Frontal lessons.

## Textbook and teaching resource

Slides and scientific papers.

## Semester

First semester.

## Assessment method

Evaluation by written test of the acquisition of basic concepts of vascular fluid-dynamics.

## Office hours

Contact by e-mail.

## Sustainable Development Goals