



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Modeling and Simulation I

2223-4-H4102D027-H4102D096M

---

#### Aims

To provide the concepts necessary to understand the modeling and simulation tools for the cardiovascular system, and to critically analyze the outputs

#### Contents

The clerkship covers the most important aspects related to theoretical models of cardiovascular fluid mechanics. Students will acquire the basic knowledge required to investigate blood flow distribution and the role of physical parameters in cardiovascular function.

#### Detailed program

1. Application of theoretical models to cardiovascular fluid dynamics
2. Boundary conditions and physical properties of biological tissues to be considered in hemodynamic simulations
3. Practical use of a software for image segmentation, blood flow and cardiac simulations

#### Prerequisites

Basic knowledge of the foundations of cardiovascular physiology, hemodynamic modeling and information technology.

## **Teaching form**

Lectures on hemodynamic simulations  
Analysis of a hemodynamic segmentation and simulation software  
Practical simulation activities

## **Textbook and teaching resource**

Open Source software SimVascular  
Online documentation and tutorials on SimVascular  
Image dataset for practical examples  
Slides of the course

## **Semester**

First Semester

## **Assessment method**

Evaluation of practical skills on the use of the numerical hemodynamic simulation software through an application example in large arteries

## **Office hours**

Contact by e-mail

## **Sustainable Development Goals**

GOOD HEALTH AND WELL-BEING

---