

# Introduction to bioprocess design, scale-up, and simulation

Bioprocess engineering scope and digital methodology

**Online course:** organized on-demand

**Course fee:** 350 € per session

## Course content

4 sessions

Session scheduling: suggested one per week

Effort: 3 - 6 h per session

## COURSE DESCRIPTION

The course provides an introduction to the scope and methodology of bioprocess engineering. It outlines the modeling-simulation, design, scale-up, economic and environmental optimization of industrial bioprocesses.

The course offers a combination of methodological presentations, and two case study projects on the digital design and optimization of bioprocesses.

## INSTRUCTOR

Jean-Marc Engasser, BioProcess Digital

## DIGITAL LEARNING

- Learning platform with course resources
- Live or recorded slideshow videos
- Case studies on spreadsheet templates with self-corrections and guides
- Online collective or one-to-one tutoring

## COURSE PROGRAM

### Session 1

#### Bioprocess engineering

- Industrial bioprocesses
- Design and scale-up of bioprocesses

#### Case study: Enzyme production process design

- Material balance.
- Energy consumption

### Session 2

#### Bioprocess engineering

- Bioprocesses economic and environmental optimization

#### Case study: Enzyme production process design (2)

- Investment and production cost evaluation
- Environmental impacts evaluation

### Session 3

#### Bioprocess engineering

- Modeling-simulation of bioprocesses

#### Case study: Yeast fermentation optimization

- Construction of the simulation model of batch and continuous fermentations

### Session 4

#### Bioprocess engineering

- Bioprocess engineering methodology

#### Case study: Yeast fermentation optimization (2)

- Digital scale-up and optimization of the fed-batch fermentation