

**ONLINE COURSE**

On-demand

COURSE FEE

350 € per session

COURSE ORGANIZATION

Course divided in 3 sessions

Session scheduling: suggested one per week

Effort: 3 - 6 h per session

COURSE DESCRIPTION

This introductory course provides a solid foundation in microbial fermentation engineering, designed for students and professionals new to the field of bioprocess engineering. It covers core principles for simulating, scaling up, and optimizing microbial fermentation processes across diverse industrial applications. Through practical examples—including aerobic and anaerobic fermentations for the production of cells, metabolites, and proteins—participants will explore methodologies in kinetic analysis, process simulation, and fermentation optimization.

INSTRUCTOR

Jean-Marc Engasser, BioProcess Digital

DIGITAL LEARNING

- Learning platform with course resources
- Live or recorded slideshow videos
- Case studies on spreadsheets templates
- Online collective or one-to-one tutoring

COURSE PROGRAM**Session 1: Stoichiometry and kinetics of microbial fermentations**

Stoichiometry and kinetics of industrial fermentation processes for the production of cells, metabolites and proteins. Global fermentation rates and microbial specific rates: cells growth, substrates consumption and products formation

Session 2: Modeling and simulation of microbial fermentations

Key biological and physical phenomena influencing fermentations: cellular reaction, oxygen transfer, medium dynamics
Development of simulation models combining mass balances with cellular rates and oxygen transfer rate laws

Session 3: Optimal operation of microbial fermentations

Comparative analysis of batch, continuous and fed-batch operation modes: principles, performances, limitations.
Strategies for optimizing process variables to maximize fermentor productivity.