


ONLINE COURSE

On-demand

COURSE FEE

350 € per session

COURSE ORGANIZATION

Course divided in 4 sessions

Session scheduling: suggested one per week

Effort: 3 - 6 h per session

COURSE DESCRIPTION

The course provides an introduction to the concepts and methodologies employed by bioprocess engineers in the design and scale-up of cellular bioreactors.

You will gain a basic understanding of key phenomena influencing cell cultures. And you will learn how to operate bioreactors to efficiently produce biopharmaceuticals, such as cells, proteins, and viruses.

INSTRUCTOR

Jean-Marc ENGASSER, BioProcess Digital

DIGITAL LEARNING

- Learning platform with course resources
- Live or recorded slideshow videos
- Spreadsheet exercises and bioreactors simulators
- Online collective or one-to-one tutoring

COURSE PROGRAM
Part 1: Bioreactors influencing biochemical and physical phenomena
Session 1: Animal cell cultures kinetics

Rates of cells growth and death, substrates consumption, metabolites production

Rates dependences on medium composition

Session 2: Oxygen and CO₂ solubilities and transfer rates

Solubilities of oxygen and carbon dioxide in media

 Transfer rates of oxygen and CO₂ between air and culture medium in bioreactors

Part 2: Optimal cell culture bioreactors operations
Session 5: Bioreactor batch and fed-batch operations

Batch operation: optimization of substrates concentrations and product induction time

Fed-batch operation under substrates limitations: optimization of medium feeding

Session 4: Bioreactor perfusion operations

Perfusion reactors with suspended and adherent cells

Optimal perfusion operations for high cell densities and reactor productivities

The two parts of the course can be taken independently