BioProcess Digital

PROFESSIONAL COURSES IN BIOPROCESS ENGINEERING

ONLINE COURSE

On-demand

COURSE FEE

300 € per session

COURSE ORGANIZATION

Course divided in 9 sessions

Session scheduling: suggested one per week

Effort: 4 - 8 h per session

COURSE DESCRIPTION

The course teaches the methodology of the kinetic analysis, the modeling-simulation, the scale-up and the optimal operation of fermentation processes.

The guiding thread of the course is a R&D project on the glutamic acid fermentation. The objective is to use the most efficiently a bacterial strain in a 200 m^3 industrial fermentor, in order to reach the highest annual glutamate production, or lowest glutamate production cost.

INSTRUCTOR

Jean-Marc Engasser, BioProcess Digital

DIGITAL LEARNING

- Learning platform with course resources
- Live or recorded slideshow videos
- Fermentation project on spreadsheets templates with self-corrections and guides
- Online collective or one-to-one tutoring

COURSE PROGRAM
Session 1: Kinetic analysis of the fermentation At the laboratory, evaluation of the rates of bacteria growth, sugar consumption, and metabolites production
Session 2: Kinetic analysis of oxygen consumption and transfer At the laboratory, determination of the oxygen consumption rate, of the oxygen solubility and air to medium transfer rate
Session 3: Fermentation modeling-simulation Modeling-simulation of the bacteria growth and metabolism in the laboartory batch fermentor
Session 4: Batch fermentation scale-up and production optimization Scale-up of the fermentation simulation model. Optimization of the batch fermentation operation for highest production
Session 5: Batch fermentation cost optimization Cost evaluation of the fermentation process. Optimization of the batch fermentation operation tor lowest production cost
Session 6: Continuous fermentation optimization Optimal operation of the continuous fermentation for reduced co-metabolites excretion and lowest cost
Session 7: Fed-batch fermentation optimization Optimal operation of the fed-batch fermentations for reduced co-metabolites excretion and lowest cost
Session 8: Fermentation intensification by oxygen-enriched air Optimization of the fed-batch fermentor, aerated with oxygen-enriched air, for increased production
Session 9: Fermentation intensification by perfusion operation Optimization of the microfilitration membrane fermentor, for increased production under perfusion operation