



## Bioprocess Development for Mammalian Cell Cultures

This course is designed for people from R&D and manufacturing groups with expertise in cell culture who are interested in learning about basic bioprocess engineering principles relevant for process development, scale-up and manufacturing with impact on protein-free cultivation of recombinant mammalian cells in bioreactors.

Relevant cultivation techniques will be presented as well as basic bioprocess engineering principles comprising bioreactor types and configuration, bioreactor operation and the development of cultivation strategies. Lectures will be followed by practical demonstrations and hands-on experience for the participants.

### Monday:

- **Bioreactor Engineering**
- **Reactor Types**
- **Set up and Configuration**
- **Reactor Periphery**
- **Process Parameter Measurement and Control**

### Thursday:

- **Process Development and Optimisation**
- **Development Strategies: Process and Product**
- **Process Requirements**
- **Process Control Strategies**
- **Medium Optimisation**

### Tuesday:

- **Bioreactor Operation**
- **Process Modes**
- **Process Balancing**
- **Fed-Batch vs. Perfusion**
- **Adherent Culture vs. Suspension**
- **in Process Control**

### Friday:

- **Scale Up**
- **Role of the Process Development Group**
- **Process Transfer**
- **Scale-Up Parameter**
- **Plant Design**

### Wednesday:

- **Process Evaluation and Assessment**
- **Documentation**
- **Process Parameter Calculation**
- **Parameter Evaluation**
- **Process Assessment**