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Gain specialist knowledge in bioprocessing

With our Fast Trak education, you can access application training in specialized bioprocessing techniques. The courses provide a tangible learning experience for process development and manufacturing scientists, relevant to everyday work.

Comprehensive training for your specific needs

The Fast Trak courses cover various topics from upstream to downstream. These include cell culture, bioreactor scale-up, column packing, basic chromatography, as well as optimization and scale-up for both pilot and manufacturing scales. In addition to our standard courses, customized training programs can be created according to your needs. The courses can be held in a number of languages.

Learn best practices in enabling technologies

Key aspects of traditional and single-use bioprocessing are covered in our courses. To ensure you learn key considerations for scale-up and manufacturing, we incorporate a large proportion of hands-on training as well as classroom education.

Expert instructors with insights in today’s biomanufacturing challenges

Our regional instructors are passionate about training. They draw on their experiences gained in the biomanufacturing and pharmaceutical industries. The Fast Trak courses allow you to access their deep product knowledge and understanding of the application of those products to your process. By sharing our experts’ insights we can empower you to solve your bioprocess challenges.

Global training and education centers

The course facilities are located across the world with convenient access to local knowledge. They are equipped with teaching labs furnished with our latest products and equipment. The Fast Trak regional centers are located in the USA, Sweden, Korea, India, and China. Satellite centers are found in Turkey, Germany, Japan, and Singapore. While each contributes its own area of expertise, they also serve as a common training and education center for local operations.
# Fast Trak training schedule 2017

## Upstream processing

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<tr>
<th>Course Name</th>
<th>USA, Marlborough, MA</th>
<th>India Bangalore</th>
<th>Sweden Uppsala</th>
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<tbody>
<tr>
<td><strong>CELL1 Advanced bioreactor cultivation technology</strong></td>
<td>Feb 27–Mar 2</td>
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<td>May 16–19 Oct 10–13</td>
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<tr>
<td><strong>CELL2 Advanced bioreactor cultivation and scale-up</strong></td>
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## Downstream processing

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<tr>
<td><strong>DEV1 Introduction to downstream techniques and bioprocessing</strong></td>
<td>Mar 14–16</td>
<td>Jun 20–22</td>
<td>Apr 4–6</td>
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<tr>
<td><strong>DEV2 Downstream bioprocess development</strong></td>
<td>Jun 12–16</td>
<td>Jul 10–14</td>
<td>Mar 13–17</td>
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<tr>
<td><strong>DEV4 Bioprocess scale-up and technology transfer</strong></td>
<td>Aug 15–17</td>
<td>Nov 7–9</td>
<td>Sep 5–7</td>
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<tr>
<td><strong>HTPD1 Introduction to high-throughput process development—workshop</strong></td>
<td>Apr 4–6</td>
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<td>Oct 24–26</td>
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<tr>
<td><strong>DOE1 Introduction to design of experiments</strong></td>
<td>May 16–18</td>
<td>Apr 25–27</td>
<td>Jun 13–15</td>
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<td><strong>MAB1 Downstream bioprocessing of monoclonal antibodies</strong></td>
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## Techniques

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<tr>
<td><strong>COL1 Large-scale column packing</strong></td>
<td>Apr 25–27</td>
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<td>Mar 21–23 Sep 19–21</td>
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<td>Sep 12–14</td>
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<tr>
<td><strong>COL2 Basic Column packing Bangalore, India—facility only</strong></td>
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<tr>
<td><strong>MEM1 Bioprocessing using membrane separations</strong></td>
<td>May 2–4</td>
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## UNICORN™ system control

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<tr>
<td><strong>UNI1 Advanced UNICORN system control for chromatography systems</strong></td>
<td>Oct 17–19</td>
<td>Mar 7–9</td>
<td>Feb 28–Mar 2</td>
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## Quality assurance

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<tr>
<td><strong>VWS1 Validation—workshop</strong></td>
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Please contact your regional Fast Trak center for custom courses and the latest calendar updates.

For further info and registration please visit: [www.gelifesciences.com/FastTrakTraining](http://www.gelifesciences.com/FastTrakTraining)
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<th>Germany, Munich</th>
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Upstream processing

Advanced bioreactor cultivation technology (CELL1)

*Duration: 3 days*

**Course description**

This course covers bioreactor cultivation and upstream process development strategy using single-use equipment. You will learn how to optimize processes and monitor critical parameters for scale-up.

We also discuss validation and process design considerations for good manufacturing practice (GMP).

Practical sessions include bioreactor inoculation and evaluation of cell culture performance using analytical techniques. You will develop a medium and feed strategy based on cell metabolism and scale it up using key engineering principles.

- In-depth training on cell culture technology
- Optimization and development of medium
- Process development and evaluation, scale-up, and bioengineering in an animal cell culture

**Who should attend?**

This training course will be useful for research and development scientists, process engineers, and manufacturing technicians. A basic understanding of cell culture and corresponding techniques is required for this course.

**After the course, you will be able to:**

- Have a detailed theoretical background about process control strategies in bioreactors and culture scale up
- Be trained in controlling and evaluating fed-batch and perfusion cultures
- Know how to perform basic characterization of a bioreactor and interpret the results
- Have an overview of strategies used for process optimization

**Topics covered**

- From cell culture to bioreactor
- Determine mixing time and $k_L a$
- Aseptic fluid transfer
- Process control in bioreactors
- Inoculate fed-batch and perfusion cultures
- Development of cell culture media
- Cell metabolism
- Inoculate a micro-carrier culture
- Process evaluation
- Calculate cell specific nutrient consumption and design a feed concentrate
- Process optimization
- Culture scale up
- Validation of cell culture based processes
- Cell separation
- Analysis of Product concentration
- Scale up of filtration-based methods
- Harvest culture
Advanced bioreactor cultivation technology pilot scale (CELL2)

Duration: 3 days

Course description
This course covers bioreactor cultivation and upstream process development strategy using single-use equipment at pilot scale. You will learn how to optimize processes and monitor critical parameters for scale-up. We also discuss validation and process design considerations for good manufacturing practice (GMP).

Practical sessions include bioreactor inoculation and evaluation of cell culture performance using analytical techniques. You will develop a medium and feed strategy based on cell metabolism and scale it up using key engineering principles.

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- Optimization and development of medium
- Process development and evaluation, scale-up, and bioengineering in an animal cell culture

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- Validation of cell culture based processes
- Cell separation
- Analysis of Product concentration
- Scale up of filtration-based methods
- Harvest culture
Downstream processing

Introduction to downstream techniques and bioprocessing (DEV1)

Duration: 3 days

Course description
Learn downstream processing techniques suitable for large-scale protein purification and considerations for process development. The course provides understanding of the techniques and parameters governing separation.

You will operate lab-scale ÄKTA™ avant systems using a variety of chromatography resins to separate and purify a crude feed.

• Basics in industrial processing and chromatographic techniques suitable for large-scale purification
• Different chromatographic techniques
• Purification strategies and optimization
• Process hygiene and column packing
• Laboratory practicals: purification of protein from clarified E. coli lysate or milk whey

Who should attend?
• Scientists new to industrial chromatography
• R&D scientists and process engineers—to review the basics of protein purification

After the course, you will be able to:
• Screen and optimize bioprocesses in your process development work
• Apply effective chromatographic techniques in your downstream purification process
• Understand the issues associated with optimizing chromatographic unit operations in biopharmaceutical production processes

Topics covered
• Purification techniques and strategies
• Size exclusion chromatography (gel filtration)
• Ion exchange chromatography
• Hydrophobic interaction and reversed phase chromatography
• Affinity chromatography
• Column packing and testing
• Optimization
• Scale-up and fine tuning
• Process hygiene
• Regulatory requirements
Downstream bioprocess development (DEV2)

Duration: 5 days

Course description
This hands-on course covers advanced downstream processing design, optimization, and troubleshooting of chromatographic processes. The training is geared towards strategic thinking. The focus is on design and optimization of critical operating parameters involved in developing a scalable, economic, and robust chromatographic process. Related topics covered include process hygiene, column maintenance routines, and scale-up issues. You will develop a three-step chromatographic process. You will also optimize the process for purity, recovery, and productivity suitable for manufacturing scale.

- How strategic thinking, optimal choice, and development of chromatographic techniques secure a highly productive and economical process
- Key issues in process development
- Practicals: development of a scalable process for purification of α-glucosidase from cell homogenate of S. cerevisae

Who should attend?
- R&D scientists and process development engineers with a basic knowledge of chromatographic techniques used in biopharmaceutical processes
- Scientists and engineers interested in deepening their knowledge about design, optimization, and troubleshooting of chromatographic processes

After the course, you will be able to:
- Identify critical issues in designing a scalable chromatographic process
- Evaluate chromatographic resins and combinations of techniques suitable for industrial purification and scale-up
- Understand optimization strategies for maximizing process performance

Topics covered
- Adsorption chromatography
- Design issues in downstream processing
- Method optimization
- Resin cleaning
- Scale-up with calculations
- Development of a scalable three-step purification process:
  - Optimization of selectivity/binding, elution, capture, intermediate, and polishing steps
  - Optimization of load/dynamic breakthrough capacity
  - Scale-up and verification
  - Different elution strategies
  - Resin screening
  - Harvest culture
Bioprocess scale-up and technology transfer (DEV4)

Duration: 3 days

Course description
Understand advanced late stage process development, scale-up, and transfer. This course will cover process design and optimization for production. It will provide an introduction to validation and column packing. The importance of safety and economic issues related to automation will also be discussed.

You will optimize conditions in a two-step process and work on maintaining separation performance at increasing scales. Group exercises and discussions will focus on "real-life" scale-up issues, complementing the hands-on work.

- Focus on smooth scale-up, well-prepared technical transfer, and the use of chromatography as a manufacturing tool
- Process design, optimization, management, and economy
- Practicals: separation of yeast glucoamylase isozymes at lab-, pilot-, and manufacturing-scale via desalting and ion exchange chromatography

Who should attend?
- R&D scientists or engineers who need to learn more about scale-up, scale-down, and operation of chromatographic methods in a production environment
- Scientists at either end of the transfer process, from lab to production and QA/QC, who need to understand the pitfalls and critical issues

After the course, you will be able to:
- Understand the theory and practice of scaling up chromatographic processes
- Identify critical issues that impact final production performance and economics of bioprocessing
- Suggest improvements for increased productivity, efficiency, effectiveness, and economy

Topics covered
- Process design and optimization
- Scale-up and technical transfer of chromatography and filtration
- Process management, economy, and hygiene
- Qualification
- Validation
- Optimization of chromatography experiments
- Lab- and pilot-scale verification runs
- Final-scale runs
- Scale-up case study exercise

"The pharma/biotech industry here in Turkey is still developing; particularly in the biotechnology space. I was lucky to find a team of dedicated and well-trained staff in Arven at the beginning of my career as a scientist two years ago, but participating in the Fast Trak hands-on training in Turkey helped me to gain a more detailed understanding of chromatography and downstream processing. This is important as my organization works to become a global player in the biopharmaceutical industry, bringing our biosimilars to an international market."

Gözde ÖzKir Güncan, Biotechnology Production Assistant Specialist, Arven Pharmaceuticals
Introduction to high-throughput process development—workshop (HTPD1)

Duration: 3 days

Workshop description
This workshop focuses on process development and optimization of purification steps using high-throughput process development (HTPD). Learn how PreDictor™ 96-well filter plates and PreDictor RoboColumn™ minicolumns, prefilled with chromatography resins, are used both in manual and automated mode to define optimal process conditions.

The use of PreDictor plates for uptake and elution studies is practiced in lab exercises. The automated use of PreDictor RoboColumn units will also be demonstrated and discussed. Application examples for PreDictor plates are presented including practical hints and tips.

- Hands-on experience with HTPD tools and strategies
- Use of PreDictor 96-well filter plates and PreDictor RoboColumn minicolumns
- Application examples

Who should attend?
- Process development scientists and development engineers who need an introduction to the use of HTPD for the design, development, optimization, and troubleshooting of chromatography processes.

After the course, you will be able to:
- Plan, design, and conduct HTPD experiments
- Comprehend key factors that should be taken into consideration when executing HTPD applications

Topics covered
- Introduction to HTPD
- HTPD with PreDictor plates
- Assist software
- Uptake studies
- Elution studies
- Automation utilizing a robotic system
- Column verification
- Wash and flow through studies
- Cleaning-in-place studies
- mAb process development and optimization
Introduction to design of experiments (DOE1)

Duration: 3 days

Course description
This course gives an introduction to design of experiments (DoE) principles and the statistical terms associated with them. We will also discuss different DoE designs and the process of evaluating results.

Hands-on exercises will provide experience in evaluating various pre-generated DoE data files. You will also set up and run your own DoE experiment on an ÄKTA avant system, assess potential responses, and evaluate the results.

- Overview of DoE in process development and its application using ÄKTA avant systems
- Understand the concept of DoE, how it relates to quality by design (QbD) and how it plays and important role in establishing a process design space
- Discover how to choose a suitable experimental design according to different applications and scenarios
- Learn how to evaluate data from DoE investigations and how DoE results can be employed to define design and operating spaces
- Gain systems and application knowledge related to DoE

Who should attend?
- This training will be useful for research and development scientists.

After the course, you will be able to:
- Run and design various DoE experiments
- Assess potential response and evaluate DoE data files

Topics covered
- QbD: overview and relevance of DoE
- Introduction to statistics
- DoE theory: key concepts, various experimental designs and their properties, evaluation of results from DoE investigations
- Introduction to UNICORN control software
Downstream bioprocessing of monoclonal antibodies (MAB1)

Duration: 4 days

Course description
Get an introduction to mAbs and current challenges involved in biopharmaceutical production. You will learn general purification strategies focusing on platform processes using affinity chromatography for capture. We will also discuss polishing steps, including multimodal techniques for key contaminant removal.

In the practical session, you will define operating conditions for a human mAb process optimized for yield, productivity, and process economy. Biosimilars, analytical techniques, and manufacturing-scale considerations for purification of mAbs will also be discussed.

- Downstream processing of mAbs using chromatography
- Discussion of generic purification processes for mAb purification
- Strategies for optimization of the individual chromatography steps
- Introduction to common analytical techniques used for mAb characterization
- Discussion of manufacturing-scale considerations related to the purification of mAbs

Who should attend?
- Scientists and engineers looking for an introduction to process development methods for mAb purification intended for biopharmaceutical applications.

After the course, you will be able to:
- Communicate the usefulness of different techniques dependent on source material
- Define a platform process for mAb purification suitable to the process objectives
- Develop optimization methods and understand regulatory concerns unique to mAb manufacturing processes

Topics covered
- Introduction to mAb purification
- Sequencing of chromatography steps
- Optimization of capture step
- Purification strategies
- Affinity chromatography in mAb purification
- Optimization of polishing steps
- Ion exchange chromatography in mAb purification
- Hydrophobic interaction chromatography in mAb purification
- Ligand leakage from affinity chromatography resins
- Process hygiene and regulatory issues
Techniques

Large-scale column packing (COL1)

*Duration: 3 days*

**Course description**

This hands-on course focuses on optimizing large-scale column packing and handling methods as well as testing and maintenance of chromatography resins in large-scale columns. We will address factors influencing separation performance and the relationship to reproducibility, stability, and economy in an industrial manufacturing setting.

You will pack and test large-scale columns, with different design features and dimensions, using several types of chromatography resins.

- Hands-on practice for preparing and maintaining large-scale chromatography columns
- Column packing-lectures and exercises
- Column testing and troubleshooting
- Guidelines for writing standard operating procedures (SOPs)
- Column qualification and resin lifetime

**Who should attend?**

- Production personnel responsible for column packing or column performance issues
- Process development scientists, engineers, and operators working with chromatographic columns at pilot scale
- System engineers interested in the design and handling aspects of column-based production operations

**After the course, you will be able to:**

- Understand the critical issues in large-scale column packing based on your own practical experience
- Pack and test large columns more rapidly and efficiently
- Identify major issues and troubleshoot current concerns to avoid problems in the future

**Topics covered**

- Protein purification strategies
- Column packing requirements and techniques
- Column/resin considerations
- Column evaluation
- Column and resin cleaning and maintenance
- Troubleshooting
- Sanitization of resin and equipment
Small-scale column packing (COL2)

*Duration: 3 days*

**Course description**
This hands-on course focuses on optimizing small-scale column packing, handling methods as well as testing and maintenance of chromatography resins. We will address factors influencing separation performance and the relationship to reproducibility and stability.

You will pack and test small-scale columns, with different design features and dimensions, using several types of chromatography resins.

- Hands-on practice for preparing and maintaining small-scale chromatography columns
- Column packing-lectures and exercises
- Column testing and troubleshooting
- Guidelines for writing standard operating procedures (SOPs)
- Column qualification and resin lifetime

**Who should attend?**
- Production personnel responsible for column packing or column performance issues
- Process development scientists, engineers, and operators working with chromatographic columns at pilot scale
- System engineers interested in the design and handling aspects of column-based production operations

**After the course, you will be able to:**
- Understand the critical issues in lab- and pilot-scale column packing based on your own practical experience
- Pack and test lab- and pilot-scale columns more rapidly and efficiently
- Identify major issues, trouble shoot current concerns and avoid problems in the future

**Topics covered**
- Protein purification strategies
- Column packing requirements and techniques
- Column/resin considerations
- Column evaluation
- Column and resin cleaning and maintenance
- Troubleshooting
- Sanitization of resin and equipment
Biotechnology Group Leader

“I have been in the pharmaceutical industry for more than 15 years in Turkey. Currently, we are focused on monoclonal antibody development and production. This course improved our understanding on downstream development and had valuable impact for developing efficient purification steps and getting higher yields. GE’s Fast Trak laboratory is very well equipped and the trainers are very experienced.”

R. Serdar Alpan, MD, PhD, MSc., Turgut Pharmaceuticals

Bioprocessing using membrane separations (MEM1)

Duration: 3 days

Course description

Learn about membrane separation techniques used in bioprocessing with emphasis on cross flow filtration (CFF) techniques using open and/or screen channel devices. The course provides a general understanding of optimization, cleaning, validation, and scale-up.

In the practical sessions, you will learn basic methods, including membrane preparation, air diffusion, and integrity testing. You will also conduct experiments on optimizing clarification and concentration/diafiltration steps.

- Membrane separation techniques for the purification of biomolecules
- Comparison on alternative filtration techniques
- Presentation and discussion of cross flow techniques
- Focus on process optimization, cleaning validation, and scale-up of membrane separation procedures
- Hands-on work with filtration system testing and maintenance exercises

Who should attend?

- R&D, process development and manufacturing personnel designing, executing, or advising on membrane unit operations in the biopharmaceutical industry
- Scientists and engineers working in primary recovery and clarification stages through to final purification steps
- Anyone interested in primary clarification of mammalian, bacterial, yeast, or baculovirus/insect cells

After the course, you will be able to:

- Choose the optimum membrane format or technique based on target molecule and process objective
- Define process conditions critical to the success of membrane applications
- Evaluate experimental results for optimization and scale-up calculations

Topics covered

- Cross flow filtration theory and practice for upstream and downstream processing
- Hollow fiber and cassette materials and configuration
- Process design strategies: process development, optimization, and scale-up
- System design: hardware configuration and automation
- Current topics in validation
- Hands-on training with manual and automated systems for both hollow fiber and cassettes
UNICORN system control

Advanced UNICORN system control for chromatography systems (UNI1)

Duration: 3 days

Course description
Learn both basic and more advanced UNICORN programming. The basic overview covers aspects like user and system set-up, manual control, performing runs, editing method, creating methods using block programming as well as use of air sensors and alarms or warnings. The overview is followed by more advanced programming instruction, such as conditional programming, watch commands, and start protocols. Advanced evaluation procedures, importing/exporting data, comparing results and developing reports are also covered. Optimization of system variables, networking and validation issues will be discussed.

- Advanced hands-on use of UNICORN software for system control, programming, administration, and data management
- Advanced method programming
- User and system administration
- Method writing and verification runs

Who should attend?
- Process operators and supervisors, researchers, engineers, QA/QC personnel, and project managers who need a better understanding of system control
- Scientists, engineers, operators, system owners, and administrators responsible for ensuring the performance of UNICORN-based systems, and those who support hands-on users of UNICORN in manufacturing environments

After the course, you will be able to:
- Use UNICORN software to help achieve optimal performance from your system
- Document and report results in accordance with regulatory requirements
- Understand system settings and network options

Topics covered
- Introduction to UNICORN software
- Method programming
- Lecture: method queues
- Column handling
- Conditional control (watch commands)
- System control
- Administration
- Evaluation module
- Networking, floating licenses
Quality assurance

Japan: Validation—workshop (VWS1)

Duration: 1 days

Workshop description

Gain knowledge in current approaches to process validation. The course includes using QbD and process analytical technologies (PAT). It also covers the validation of processes based on disposables. This workshop is a direct response to positive customer feedback from earlier validation workshops.

Our regulatory experts will present and discuss current aspects of validation and related issues. The understanding of downstream process validation will be enhanced by group exercises.

Who should attend?

• Process development scientists, process engineers, QA/QC personnel, validation specialists, and management personnel working in the downstream bioprocessing area

After the course, you will be able to:

• Design a validatable downstream process
• Implement cost-effective strategies for downstream process validation
• Understand specific issues for validation of mAb and vaccine manufacturing processes
• Design resin lifespan studies
• Implement the latest practices in downstream cleaning validation

Topics covered

• Qualification vs validation, equipment qualification, software validation, and GAMP™
• Cost effective process validation
• Raw materials, leakage, performance, and storage
• Validation at small- and manufacturing-scales
• Cleaning validation
• Sanitization
• Validation of disposables
• Chromatography resin lifespan
• Special validation issues for mAb and vaccine, examples for clinical phase 1
• Rapid development with regulatory compliance
Custom, on-demand courses

Custom training and process consultancy
Our global team of bioprocessing experts can provide guidance for existing unit operations as well as support in designing new processes that meet current regulatory demands and reduce time-to-market by:

- Reviewing and assessing existing processes to help define critical parameters
- Offering technical guidance and oversight for developing scalable upstream and downstream processes
- Recommending ways to increase process efficiencies
- Troubleshooting different unit operations
- Training operators at your site

FlexFactory™ operator training

*Duration: 8 to 10 days*

This course provides training on FlexFactory equipment, consumables, and automation at your qualified FlexFactory site. Training will be focused on day-to-day operation of the various components of the FlexFactory platform. This includes set-up and installation of consumables, connection and transfer between unit operations, start-up and running in automated mode, as well as troubleshooting. The course is developed for operators and those involved in daily operation of a FlexFactory platform.

Technical maintenance training

Enable faster resolution of equipment issues by improving communication between in-house service engineers and GE's field service engineers. This course offers basic equipment level 1 training through both lectures and hands-on exercises. You will learn how to interpret error codes, resolve simple issues quickly and become more effective working with GE's engineers when needed.

Advanced technical maintenance training

This training enables in-house engineers to carry out preventative maintenance. Together with GE’s documentation, this course will ensure you have the know-how to carry out service on GE-manufactured equipment.

For more information on our Fast Trak trainings please visit the [Fast Trak training and education page](#)
General course information

Fast Trak Education is one means by which GE Healthcare provides application training in the various aspects of bioprocessing. The courses are designed to provide a learning experience for process development and manufacturing staff. There are hands-on training courses on column packing, basic chromatography, optimization and scale-up for both pilot and production scales. Courses on validation issues and chromatography theory are also given. The courses are run at our regional Fast Trak centers or customized at your premises.

Cancellation policy
In case you need to cancel your registration, the following charges will apply:

- 30 to 21 days prior to course: 50% of course fee
- 20 to 8 days prior to course: 80% of course fee
- 7 days or less prior to course: 100% of course fee

If you are unable to attend after registered, you may send a colleague in your place or attend another course. GE Healthcare reserves the right to modify course location, course material, substitute speakers, or to cancel the course. If the course is cancelled, registrants will be notified as soon as possible and will receive a full refund of paid fees. GE Healthcare will not be responsible for airfare penalties or other costs incurred due to a course cancellation.

Course certificate
Upon completion of the course, each participant receives a course certificate in which course name and course date is stated.

Course evaluation
At the end of each course, you will be asked to fill in a course evaluation form. We value your opinion of the course, the speakers, the material, and presentations and use this feedback to continuously improve the courses and their contents.

Travel and hotel costs
Travel and hotel costs are not included in the course price.

Language
Standard courses are held in English at Fast Trak Centers in USA, Sweden, Turkey, India, Singapore and Korea, unless otherwise specified. In China, most courses are in Chinese with occasional courses in English. The courses in Germany are held in German and courses in Japan are held in Japanese. Customized courses can be presented in other languages. Please contact the Fast Trak center for more information.

Lunches
All lunches during course days are included in the course prices.

Material in binders
Each course participant will receive the lectures and other relevant material in a binder.

Requirements for safety level S1 (L1) laboratories
Every course participant who enters our laboratories for the practical sessions must comply with certain safety requirements. Please notice that open-toe shoes are not allowed in the lab. Obligatory protective clothing and safety devices will be provided.
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