Downstream Principles and Techniques

This four day training program provides an introduction to downstream processing and the major unit operations involved. Fifty five percent of this program is hands-on in the lab. This program was developed for those new to downstream processing who wish to gain hands-on experience and practice running NFF, TFF and Chromatography unit operations.

**SCHEDULE:**

**Day 1**
- **Lectures (4 hrs.)**
  - Downstream Biomanufacturing Process Overview
  - Principles of Centrifugation
  - Principles of Forward Flow Filtration
  - Principles of Chromatography
  - Equations for column operations & packing
- **Labs (3 hrs.)**
  - Continuous Flow Centrifugation (disc stack)
  - Filtration
  - Column preparation, packing equations & resin slurry determination

**Day 2**
- **Lectures (2 hrs.)**
  - Introduction to Protein for Downstream Processing
- **Labs (6 hrs.)**
  - Column Assembly, Packing & Qualifications
  - Drip column pH & Conductivity Testing

**Day 3**
- **Lectures (2 hrs.)**
  - Virus Inactivation & Removal
- **Labs (6 hrs.)**
  - Chromatography Column Operation (bench scale and pilot scale)

**Day 4**
- **Lectures (4 hrs.)**
  - TFF Principles and Applications
  - Chemical Analysis
  - Introduction to Downstream Disposables and Processing
- **Labs (3 hrs.)**
  - TFF (UF/DF multiple stations)

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