



# WPI

**BIOMANUFACTURING EDUCATION  
& TRAINING CENTER (BETC)**  
ENHANCE YOUR SKILLS & ADVANCE YOUR CAREER

## Biomufacturing Unit Operations & Comprehension

### **Objectives:**

This course provides a high level overview and discussion of the biomufacturing process and the functional unit operations necessary to produce and purify a protein of interest. Emphasis is placed on the functional aspects of manufacturing operations and the relationships between each unit. Time is spent with bench top and pilot scale equipment in open discussion and challenge exercises aimed at fostering a comprehensive understanding of biomufacturing unit operations.



### **Major Topics Covered:**

- Upstream processing: preparing a culture inoculum through bench-scale bioreactor monitoring.
- Product isolation: centrifugation through the filter train.
- Downstream processing: tangential flow filtration through chromatography.
- Presentation and discussion of support functions enabling the unit operations teams to function efficiently.

### **Sample Schedule:**

#### **Day 1**

- End-to-end process review
- Upstream processing background and unit operations

#### **Labs:**

- Aseptic techniques
- Process seed train and benchtop reactors
- Large systems walkdowns
- Components, controls, failure points, troubleshooting

#### **Day 2**

- Harvest topics, including filtration and centrifugation

#### **Labs:**

- Monitoring reactor progress
- Tangential flow filtration
- Pressure holds/steam/clean-in-place

#### **Day 3**

- Chromatography Overview
- New technologies

#### **Labs:**

- Pilot skid walkdown and discussion
- Bench scale chromatography demonstration

**Learn More: [WPI.edu/+BETC](http://WPI.edu/+BETC)**

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