Upstream Biomanufacturing (Certificate)

Graduate students and working professionals can now earn a new credential to kick-start or advance their career in the biopharmaceutical industry. The Upstream Biomanufacturing graduate certificates offer NC State graduate students and working professionals the opportunity for hands-on learning in BTEC's industry-scale simulated cGMP facilities.

Each certificate requires 12 hours of graduate coursework, which can be transferred to the Master of Biomanufacturing program. The majority of BTEC's graduate courses are offered in the evening or online to better accommodate working professionals.

The certificate can be completed in two part-time semesters.

More Information

Upstream Biomanufacturing Program Website (http://www.btec.ncsu.edu/ academic/graduate/graduate_certificate.php)

To enroll in a BTEC certificate program, applicants must meet the following conditions:

- Applicants must hold a bachelor's degree in science or an engineering discipline.
- Applicants must have a minimum GPA of 3.0 or have completed a 500-level BTEC (BEC) course with a grade of B- or better.
- Applicants must apply through the NC State Graduate School.

Applicant Information

- **Delivery Method:** On-Campus
- **Entrance Exam:** None
- **Interview Required:** None

Application Deadlines

Please visit The Graduate School Application Deadlines (https:// grad.ncsu.edu/admissions/deadlines/) page for more information.

Plan Requirements

Code	Title	Hours	Counts towards
Required Courses		**9**	
CHE 563	Fermentation of Recombinant Microorganisms		
BBS 526	Upstream Biomanufacturing Laboratory		
BEC 580	cGMP Fermentation Operations		
BEC 577	Advanced Biomanufacturing and Biocatalysis		
Elective Course		**3**	
Select a minimum of three credits of the following:			
BEC 588	Animal Cell Culture Engineering		
BEC 575	Global Regulatory Affairs for Medical Products		
BEC 525	Molecular Biology for Biomanufacturing		
BEC 545	Cell Line Development for Biomanufacturing		
BIT 510	Core Technologies in Molecular and Cellular Biology		
BIT 566	Animal Cell Culture Techniques		
Total Hours		**12**	