## Biomanufacturing (Certificate) (For Post-Baccalaureate Students)

The Certificate in Biomanufacturing provides graduates with the knowledge base and hands-on skills that will prepare them to quickly contribute to a cGMP biomanufacturing operation in significant ways and should reduce the time needed for on-the-job training in those operations.

## **Program Coordinator**

Pa Nhia Moore

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## **Academic Structure**

Term Effective: 1/2009 Plan Code: 32BTECCTU CIP Code: 26.1201 Description: Undergraduate Certificate in Biomanufacturing Offered: On-campus format

## **Plan Requirements**

**Prerequisite:** In order to enroll in the first course in the program, applicants must have earned a bachelor's level degree, and have completed CH 223 Organic Chemistry II (or equivalent) and BIO 183 Introductory Biology: Cellular and Molecular Biology. Interested graduates should contact the BTEC's manager of student programs.

Credits earned toward a bachelor's degree will not count for credit in the post-baccalaureate certificate.

Requirements for the Post-Baccalaureate Undergraduate Certificate in Biomanufacturing include a minimum of **13 credit** hours as specified below. All courses must be completed with a grade of 'C-' or higher:

С	ode	Title	Hours		
R	equired Course	es:	6		
	BEC 425	Molecular Biology for Biomanufacturing			
	or BEC 445	Cell Line Development for Biomanufacturing			
	BEC 330	Principles and Applications of Bioseparations			
	BEC/CHE 463	Fermentation of Recombinant Microorganisms			
Biomanufacturing Specialization:					
Select one specialization area:					
	Upstream Ope	rations:			
	BEC 426 & BEC 480	Upstream Biomanufacturing Laboratory and cGMP Fermentation Operations			
	Downstream O	perations:			
	BEC 436 & BEC 485	Introduction to Downstream Process Developme and cGMP Downstream Operations	ent		
Elective Courses:					
S	Select three credits of the following:				

т/	stal Hours		12
	MB 455	Microbial Biotechnology	
	GN 311	Principles of Genetics	
	BIT 466	Animal Cell Culture Techniques	
	BIT 410	Manipulation of Recombinant DNA	
	or BCH 451	Principles of Biochemistry	
	BCH 351	General Biochemistry	
	BEC 495	Special Topics in Biomanufacturing	
	BEC/CHE 488	Animal Cell Culture Engineering	
	BEC 485	cGMP Downstream Operations	
	BEC/BME 483		
	BEC 480	cGMP Fermentation Operations	
	BEC 475	Global Regulatory Affairs for Medical Products	
	BEC/CHE 462	Fundamentals of Bio-Nanotechnology	
	BEC/CHE 448	Bioreactor Design	
	BEC 445	Cell Line Development for Biomanufacturing	
	BEC 436	Introduction to Downstream Process Development	
	BEC/BBS 426	Upstream Biomanufacturing Laboratory	
	Any 4** or 5** l	Level BEC Course	

Total Hours

13

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