



Biomanufacturing Training  
and Education Center

### Upstream Biomanufacturing Graduate Certificate

	Course	Title	Duration	Credits	Offered
Core Courses	CHE 563	Fermentaiton of Recombinant Microorgansims	8-week	2	fall, spring
	BEC 526	Upstream Biomanufacturing	8-week	2	fall, spring
	BEC 580	cGMP Fermentation Operations	8-week	2	fall, spring
	BEC 577	Advanced Biomanufacturing and Biocatalysis	16-week	3	spring

Electives; Min. 3 credits required	BEC 575	Global Regulatory Affairs for Medical Products (online)	16-week	3	fall, spring
	BEC 588	Animal Cell Culture Engineering	8-week	2	spring
	BEC 525	Molecular Biology for Biomanufacturing	8-week	2	fall, spring
	BEC 545	Cell Line Develoment for Biomanufacturing	8-week	2	fall, spring
	BEC 572	Drug Delivery: Theory and Modern Practices	16-week	3	spring
	BUS 554	Project Management	16-week	3	varies

Other electives by approval

### Downstream Biomanufacturing Graduate Certificate

	Course	Title	Duration	Credits	Offered
Core Courses	BEC 532	cGMP Biomanufacturing Operations	8-week	2	fall, spring
	BEC 536	Introduction to Downstream Process Development	8-week	2	fall, spring
	BEC 585	cGMP Downstream Operations	8-week	2	fall, spring
	BEC 575	Global Regulatory Affairs for Medical Products (online)	16-week	3	spring

Electives; Min. 3 credits required	BEC 577	Advanced Biomanufacturing and Biocatalysis	16-week	3	spring
	BEC 515	Biopharmaceutical Product Characterization Techniques	8-week	2	spring
	BEC 562	Fundamentals of Bio-Nanotechnology	16-week	3	spring
	BEC 572	Drug Delivery: Theory and Modern Practices	16-week	3	spring
	BUS 554	Project Management	16-week	3	varies

Other electives by approval

### Online Biomanufacturing Graduate Certificate

	Course	Title	Duration	Credits	Offered
Core Courses	BEC 591	cGMP Biomanufacturing Operations	16-week	3	fall
	BEC 575	Global Regulatory Affairs for Medical Products	16-week	3	fall, spring
	BEC 577	Advanced Biomanufacturing and Biocatalysis	16-week	3	spring

Electives; 3 credits required	BEC 572	Drug Delivery: Theory and Modern Practices	16-week	3	spring
	EM 530	Project Management	16-week	3	fall, spring

Other electives by approval