

Biomanufacturing (MR)

Degree Requirements

Students may choose from the degree tracks below to complete coursework within a focus area.

Degrees earned will be distributed as: "Master of Biomanufacturing" without focus area track specifications.

Code	Title	Hours	Counts towards
Core Courses		18	

BEC 575	Global Regulatory Affairs for Medical Products		
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BEC 577	Advanced Biomanufacturing and Biocatalysis		
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BEC 590	Industry Practicum in Biomanufacturing (two semesters)		
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BEC 601	Biomanufacturing Seminar (two semesters)*		
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BEC 620	Leadership and Preparation for Industry Internship in Biomanufacturing		
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ST 511	Statistical Methods For Researchers I		
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BEC 515	Biopharmaceutica Product Characterization Techniques		
	or BEC 588 Animal Cell Culture Engineering		

Focus Area Track		6	
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Select courses from a category listed under "Focus Area Track Courses" below

Professional Courses		9	
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BUS 554	Project Management		
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Select two of the following courses:

MBA 585	Current Topics in BioSciences Management		
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MBA 586	Legal, Regulatory and Ethical Issues in Life Science Industries		
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MBA 590	Special Topics In Business Management		
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BUS 501	Strategic Management Foundations		
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COM 563	Public Relations Theory		
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COM 598	Special Topics In Communication (Intro to Science Communication: Theory/Practice)		
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Elective Courses		3	
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Select three credit hours from "Elective Courses" listed below each focus area category

Total Hours		36	
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* BEC 601 is to be repeated twice to meet two total credit hours.

Focus Area Tracks

Upstream Track

Code	Title	Hours	Counts towards
CHE 563	Fermentation of Recombinant Microorganisms	2	
BBS 526	Upstream Biomanufacturing Laboratory	2	
BEC 580	cGMP Fermentation Operations	2	
Total Hours		6	

Elective Courses

Code	Title	Hours	Counts towards
Select three credits of the following courses:		3	
BEC 525	Molecular Biology for Biomanufacturing	2	
BEC 545	Cell Line Development for Biomanufacturing	2	
BEC 532	Foundations of Downstream Processing and Formulation	2	
BEC 536	Introduction to Downstream Process Development	2	
BEC 585	cGMP Downstream Operations	2	

BEC 583	Tissue Engineering Technologies	2
BEC 595	Special Topics in Biomanufacturing	1-6
BIT 501	Ethical Issues in Biotechnology	1
BEC 669	Biomanufacturing Research Projects	1-4
BIT 510	Core Technologies in Molecular and Cellular Biology	4
BIT 566	Animal Cell Culture Techniques	2

Downstream Track

Code	Title	Hours	Counts towards
BEC 532	Foundations of Downstream Processing and Formulation	2	
BEC 536	Introduction to Downstream Process Development	2	
BEC 585	cGMP Downstream Operations	2	
Total Hours		6	

Elective Courses

Code	Title	Hours	Counts towards
Select three credits of the following courses:			3
BEC 525	Molecular Biology for Biomanufacturing	2	
BEC 545	Cell Line Development for Biomanufacturing	2	
CHE 563	Fermentation of Recombinant Microorganisms	2	
BBS 526	Upstream Biomanufacturing Laboratory	2	
BEC 580	cGMP Fermentation Operations	2	
BEC 583	Tissue Engineering Technologies	2	
BEC 595	Special Topics in Biomanufacturing	1-6	

BIT 501	Ethical Issues in Biotechnology	1
BEC 669	Biomanufacturing Research Projects	1-4
BIT 510	Core Technologies in Molecular and Cellular Biology	4
BIT 566	Animal Cell Culture Techniques	2

n/a

Faculty

Full Professors

Ruben G. Carbonell

Amy Michele Grunden

Harold Henry Lamb

Paul Edward Mozdziak

Balaji M. Rao

Heike Inge Ada Sederoff

John Douglas Sheppard

Associate Professors

Paul T. Hamilton

Gavin John Williams

Assistant Professor

Stefano Menegatti

Practice/Research/Teaching Professors

Kirill Efimenko

Gary Louis Gilleskie

Imara Yasmin Perera

John H. van Zanten

Emeritus Faculty

Michael Carl Flickinger

Instructors

Gregory Kale Buhrman

Hayley Flores