

# Biomanufacturing (Minor)

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## Plan Requirements

### Master's Requirements

Code	Title	Hours	Counts towards
<b>Required Courses</b>		<b>9</b>	

BEC 669	Biomanufacturing Research Projects		
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Select a minimum of eight credit hours of courses listed under "Elective Courses" below

<b>Total Hours</b>	<b>9</b>
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### PhD Requirements

Code	Title	Hours	Counts towards
<b>Required Courses</b>		<b>12</b>	

BEC 669	Biomanufacturing Research Projects		
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Select a minimum of eight credit hours of courses listed under "Elective Courses" below

<b>Total Hours</b>	<b>12</b>
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### Elective Courses

Code	Title	Hours	Counts towards
<b>Select a minimum of eight credit hours of the following courses:</b>		<b>8</b>	

BBS 526	Upstream Biomanchufacturing Laboratory	2	
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BEC 515	Biopharmaceutical Product Characterization Techniques	2	
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BEC 525	Molecular Biology for Biomanchufacturing	2	
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BEC 532	Foundations of Downstream Processing and Formulation	2	
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BEC 536	Introduction to Downstream Process Development	2	
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BEC 545	Cell Line Development for Biomanchufacturing	2	
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BEC 575	Global Regulatory Affairs for Medical Products	3	
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BEC 577	Advanced Biomanchufacturing and Biocatalysis	3	
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BEC 580	cGMP Fermentation Operations	2	
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BEC 583	Tissue Engineering Technologies	2	
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BEC 585	cGMP Downstream Operations	2	
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BEC 588	Animal Cell Culture Engineering	2	
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BEC 590	Industry Practicum in Biomanchufacturing	3	
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BEC 595	Special Topics in Biomanchufacturing	1-6	
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BIT 566	Animal Cell Culture Techniques	2	
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CHE 563	Fermentation of Recombinant Microorganisms	2	
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<b>Total Hours</b>	<b>42-47</b>
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## Faculty

### Full Professors

Ruben G. Carbonell

Amy Michele Grunden

Harold Henry Lamb

Paul Edward Mozdziaik

Balaji M. Rao

Heike Inge Ada Sederoff

John Douglas Sheppard

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### Associate Professors

Paul T. Hamilton

Gavin John Williams

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### Assistant Professor

Stefano Menegatti

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## **Practice/Research/Teaching Professors**

Kirill Efimenko

Gary Louis Gilleskie

Imara Yasmin Perera

John H. van Zanten

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## **Emeritus Faculty**

Michael Carl Flickinger

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## **Instructors**

Gregory Kale Buhrman

Hayley Flores