Biomanufacturing (Minor)

Plan Requirements

Master's Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td></td>
<td>Required Courses</td>
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<tr>
<td>BEC 669</td>
<td>Biomanufacturing Research Projects</td>
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Select a minimum of eight credit hours of courses listed under “Elective Courses” below

Total Hours 9

PhD Requirements

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Select a minimum of eight credit hours of courses listed under “Elective Courses” below

Total Hours 12

Elective Courses

Select a minimum of eight credit hours of the following courses:

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

Total Hours 42-47

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