

# PH.D. IN BIOCHEMISTRY AND MOLECULAR BIOLOGY

## Overview

There are three different tracks in which students may enter and progress towards award of the PhD in Biochemistry and Molecular Biology. The first track involves admission through the Program in Biomedical Sciences (PIBS). Alternatively, students may apply and be directly admitted to the PhD program. Finally, the Executive PhD allows students to complete coursework and perform research at their place of work. In all cases, students are assisted in tailoring a program to match his or her interests. In general, students complete courses offered in a variety of formats, e.g., formal lectures, seminars, and workshops. Each BMB graduate program's curriculum is designed to provide broad knowledge in the various aspects of molecular biology and biochemistry in addition to intensive training in certain specialized areas of research according to the student's interests.

## Admission Requirements

Applicants to biomedical programs should have a bachelor degree in a biological or related discipline (e.g., psychology, chemistry, engineering, physics). Although there are no prerequisite requirements, courses in general biology, cell/molecular biology, calculus, general physics, organic chemistry, physical chemistry, and biochemistry are encouraged. Applications are generally accepted from September to December for fall entry only. Select applicants will be offered an interview.

### Competitive Candidates Will Have the Following:

- Excellent academic record
- Research experience in a laboratory setting
- Publications of abstract and / or papers
- Co-authorship in a peer-reviewed journal is recommended
- Strong letters of recommendation from research scientists who know the candidate well
- Motivation to pursue state-of-the-art biomedical research

### Applicants Must Submit the Following:

- Online Application
- Application Fee
- Official Academic Transcripts
- English Proficiency Exam (non-native speakers)
- Statement of Purpose
- Resume / CV

Full application instructions can be found online (<http://biomed.med.miami.edu/apply/>).

## Curriculum Requirements

### Ph.D. - PIBS Plan

Code	Title	Credit Hours
<b>Biomedical Science Core</b>		
Journal Club <sup>1</sup>		2
PIB 700	Journal Club	
PIB 701	Introduction to Biomedical Sciences	5
PIB 702	Scientific Reasoning	3
PIB 705	Biostatistics for the Biosciences	3
PIB 731	Laboratory Research	1-6
PIB 780	Research Ethics	1
PIB 782	Professional Development: Skills for Success I	1
PIB 783	Professional Development: Skills for Success II	1
<b>BMB Required Courses</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 709	Advanced Biochemistry and Molecular Biology	3
BMB 714	Molecular Genetics	4
BMB 715	Structural Biology and Applications to Drug Discovery	2

<b>Research Credits</b>		<b>24</b>
BMB 830	Doctoral Dissertation	1-6
BMB 840	Doctoral Dissertation- Post Candidacy	1-6
BMB 850	Research in Residence	1
<b>Total Credit Hours</b>		<b>65-70</b>

<sup>1</sup> Students in this program take Journal Club twice for a total of 2 credits. Please see the Plan of Study for more information.

<sup>2</sup> Students in this program take BMB 701 Journal Club each semester. Please see the Plan of Study for more information.

<sup>3</sup> Students in this program take BMB 702 Scientific Seminar through the end of their third semester. Please see the Plan of Study for more information.

## Ph.D. - Direct Admit

Code	Title	Credit Hours
<b>BMB Required Courses</b>		
PIB 705	Biostatistics for the Biosciences	3
PIB 780	Research Ethics	1
PIB 782	Professional Development: Skills for Success I	1
PIB 783	Professional Development: Skills for Success II	1
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 709	Advanced Biochemistry and Molecular Biology	3
BMB 714	Molecular Genetics	4
BMB 715	Structural Biology and Applications to Drug Discovery	2
<b>Research Credits</b>		<b>27</b>
BMB 830	Doctoral Dissertation	1-6
BMB 840	Doctoral Dissertation- Post Candidacy	1-6
BMB 850	Research in Residence	1
<b>Total Credit Hours</b>		<b>63</b>

## Suggested Plans of Study

### Ph.D. - PIBS Plan

Please note that the following is only a sample curriculum plan. Current students must discuss their plan with their program director to make adjustments as needed. It is the student's responsibility to contact the program to verify the information.

Year One		Credit Hours
<b>Fall</b>		
PIB 701	Introduction to Biomedical Sciences	5
PIB 702	Scientific Reasoning	3
PIB 731	Laboratory Research	1
PIB 700	Journal Club	1
PIB 780	Research Ethics	1
PIB 782	Professional Development: Skills for Success I	1
	<b>Credit Hours</b>	<b>12</b>
<b>Spring</b>		
PIB 700	Journal Club	1
PIB 705	Biostatistics for the Biosciences	3
PIB 731	Laboratory Research	1
PIB 783	Professional Development: Skills for Success II	1
BMB 709	Advanced Biochemistry and Molecular Biology	3
BMB 715	Structural Biology and Applications to Drug Discovery (Spring II Course)	2
	<b>Credit Hours</b>	<b>11</b>

<b>Summer</b>		
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>2</b>
<b>Year Two</b>		
<b>Fall</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 714	Molecular Genetics	4
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>8</b>
<b>Spring</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>4</b>
<b>Summer</b>		
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>2</b>
<b>Year Three</b>		
<b>Fall</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>4</b>
<b>Spring</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>4</b>
<b>Summer</b>		
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>2</b>
<b>Year Four</b>		
<b>Fall</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>3</b>
<b>Spring</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>3</b>
<b>Summer</b>		
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>2</b>
<b>Year Five</b>		
<b>Fall</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>3</b>
<b>Spring</b>		
BMB 701	Research Journal Club.	1
BMB 840	Doctoral Dissertation- Post Candidacy	2

BMB 850	Research in Residence	1
	<b>Credit Hours</b>	<b>4</b>
	<b>Total Credit Hours</b>	<b>64</b>

## Ph.D. - Direct Admission Plan

Please note that the following is only a sample curriculum plan. Current students must discuss their plan with their program director to make adjustments as needed. It is the student's responsibility to contact the program to verify the information.

Year One		Credit Hours
<b>Fall</b>		
PIB 780	Research Ethics	1
PIB 782	Professional Development: Skills for Success I	1
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 714	Molecular Genetics	4
BMB 830	Doctoral Dissertation	2
	<b>Credit Hours</b>	<b>10</b>
<b>Spring</b>		
PIB 705	Biostatistics for the Biosciences	3
PIB 783	Professional Development: Skills for Success II	1
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 709	Advanced Biochemistry and Molecular Biology	3
BMB 715	Structural Biology and Applications to Drug Discovery (Spring II Course)	2
BMB 830	Doctoral Dissertation	2
	<b>Credit Hours</b>	<b>13</b>
<b>Summer</b>		
BMB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>2</b>
<b>Year Two</b>		
<b>Fall</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 710	Advanced Topics in Biochemistry and Molecular Biology	3
BMB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>7</b>
<b>Spring</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>4</b>
<b>Summer</b>		
BMB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>2</b>
<b>Year Three</b>		
<b>Fall</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>4</b>
<b>Spring</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 702	Biochemical Science Seminar <sup>3</sup>	1

BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>4</b>
<b>Summer</b>		
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>2</b>
<b>Year Four</b>		
<b>Fall</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>3</b>
<b>Spring</b>		
BMB 840	Doctoral Dissertation- Post Candidacy	2
BMB 701	Research Journal Club. <sup>2</sup>	1
<b>Credit Hours</b>		<b>3</b>
<b>Summer</b>		
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>2</b>
<b>Year Five</b>		
<b>Fall</b>		
BMB 701	Research Journal Club. <sup>2</sup>	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>3</b>
<b>Spring</b>		
BMB 701	Research Journal Club.	1
BMB 840	Doctoral Dissertation- Post Candidacy	2
BMB 850	Research in Residence	1
<b>Credit Hours</b>		<b>4</b>
<b>Total Credit Hours</b>		<b>63</b>

## Mission

Our aim is to produce graduates who are thoroughly versed in the field of Biochemistry and Molecular Biology and who have a flexibility of approach that will allow them to take full advantage of new developments and techniques in other areas of research in whatever direction their career might lead them.

## Goals

To provide students with:

- Training in discovery research and state-of-the art biomedical technologies by fostering unique and innovative research and collaborative interdisciplinary interactions among scientists of diverse backgrounds;
- An understanding of fundamental concepts in BMB and training to formulate and conduct original research;
- An ability to communicate research within the broad field of BMB as well as the community
- Training to become independent investigators.

## Student Learning Outcomes

- Students will demonstrate an overall knowledge and understanding of the core concepts in biochemistry and molecular biology, including the essential skills to conduct research in biochemistry and molecular biology.
- Students will demonstrate critical thinking skills, the capability to develop hypotheses, and the ability to evaluate their hypotheses, paying attention to responsible conduct of research as appropriate.
- Students will demonstrate the ability to write effective scientific reports and to present scientific results orally.