

# Ph.D. in Biomedical Engineering

## Specifics of the Ph.D. in Biomedical Engineering

Prior to the first semester of study, the student meets with the Ph.D. Program Committee and develops an individualized learning contract. This document maps the student's plan of study to math career goals with the Ph.D. curriculum. The development of the learning contract involves reviewing the student's prior courses, assessing future course needs, planning for qualifying exams and lab rotations, and initiating discussion of research interests. If a student enters the program with a research and mentor identified, that mentor is also included in the planning.

This learning contract is revised during each semester's advising period and it is updated as necessary. The academic Progress Committee, comprised of NJIT and RBHS faculty, monitors the progress of students in the completion of their degrees.

## Graduate Courses

### Ph.D. in Biomedical Engineering (with M.S in BME.)

Advanced BME courses in field of specialization <sup>1</sup>	12
GSND 5135Q: Research Design and Statistics (2 credits), GSND 5006Q Grantsmanship Skills II (2 credits) and an Advanced life science course reinforcing field of specialization (2-3 credits)	6-7
RBHS 5200 Introduction to Biomedical Sciences <sup>2</sup>	5
BME 611 Engineering Aspect of Molecular and Cellular Bio I	1
Laboratory rotation at NJIT	0
Laboratory rotation at RBHS	0
Dissertation research	36
<b>Total Credits</b>	<b>60-61</b>

<sup>1</sup> Generally, these courses will come from those offered at NJIT. Courses from other engineering departments are considered on a case basis.

<sup>2</sup> The "core" course and is required of all Ph.D. students in the Graduate School of Biomedical Sciences.

Ph.D students are required to attend Graduate Seminar (BME 791 Graduate Seminar) starting the semester after successfully completing the qualifying exam and every semester thereafter until completion of the degree. Students must register for BME 791 Graduate Seminar, 0 credit, and attend 50% of seminars in BME at NJIT. Students will receive a pass/fail grade.

### Ph.D. in Biomedical Engineering (with B.S. in BME)

BME and life science courses <sup>1</sup>	18
Advanced BME courses in field of specialization <sup>2</sup>	12
GSND 5135Q: Research Design and Statistics (2 credits), GSND 5006Q Grantsmanship Skills II (2 credits) and an Advanced life science course reinforcing field of specialization (2-3 credits)	6-7
RBHS 5200 Introduction to Biomedical Sciences <sup>3</sup>	5
BME 611 Engineering Aspect of Molecular and Cellular Bio I	1
RBHS 5001 Ethics in Science, Research and Scholarship	0
Laboratory rotation at NJIT	0
Laboratory rotation at RBHS	0
Dissertation research	36
<b>Total Credits</b>	<b>78-79</b>

<sup>1</sup> Work with advisor to select courses to serve as foundation (similar to an M.S.) for the advanced courses and dissertation research.

<sup>2</sup> Generally, these courses will come from those offered at NJIT. Courses from other engineering departments are considered on a case basis.

<sup>3</sup> The "core" course and is required of all Ph.D. students in the Graduate School of Biomedical Sciences.

Ph.D students are required to attend Graduate Seminar (BME 791 Graduate Seminar) starting the semester after successfully completing the qualifying exam and every semester thereafter until completion of the degree. Students must register for BME 791 Graduate Seminar, 0 credit, and attend 50% of seminars in BME at NJIT. Students will receive a pass/fail grade.

## Qualifying Courses

**RBHS-GSBS life science courses** can be found at: [http://njms.rutgers.edu/gsbs/current\\_students/course\\_information.php](http://njms.rutgers.edu/gsbs/current_students/course_information.php)

While most students take GSBS. life science courses, students may propose alternative courses taken at **Rutgers University-Center for Molecular and Behavioral Neuroscience**: <http://www.ncas.rutgers.edu/cmbn>

**NJIT/Rutgers Federated Department of Biology**: <http://newarkbioweb.rutgers.edu/biology>

**RBHS in the School of Health-Related Professions**: (<http://shrp.rutgers.edu>)<http://shrp.rutgers.edu/>

## Qualifying Examinations

Before becoming a doctoral candidate, a student must demonstrate his/her ability to integrate the knowledge acquired studies in the Qualifying Examination. This examination is offered each June and included a day-long written portion consisting of integrative questions. Shortly after the date of the written exam, students are examined orally by the Academic Progress Committee on the same questions. Students discuss and expand upon their written answers, and demonstrate their ability to engage in scholarly discussions.

## Dissertation

The dissertation represents original research, and reflects a student's ability to critically understand the significance of a problem and conduct novel, high quality, and independent research, which advances the state of the art.

Before beginning the dissertation the student will select a dissertation committee, to be chaired by the student's primary advisor, and prepare a dissertation proposal. The proposal is organized using the format of an NIH Fellowship application, identifying a unique scholarly problem, providing a critical review of related literature, proposing an appropriate hypothesis, and presenting a methodology to address the problem. The proposal is defended before the dissertation committee.

Doctoral study concludes with a written dissertation and an oral defense.