PH.D. IN BIOSTATISTICS

Overview

The PhD in Biostatistics, offered through the Division of Biostatistics in the Department of Public Health Sciences at the Miller School of Medicine, provides a flexible curriculum to cover the basics.

Admitted PhD students are expected to take a full suite of courses including several iterations of the seminar course, a consulting practicum (or advanced computing course), and a series of four to six courses that ensure the candidate has studied a subject matter discipline within biomedical research. PhD students are also expected to take high-level courses in statistical theory, survival analysis, and high-dimensional and complex data not generally taken by MS students. The PhD program consists of 37 credits of core coursework, 6 credits of introductory public health coursework, 12 credits of electives, and 12 credits of dissertation research for a total of 67 credits to complete the degree. PhD students are expected to pass a first-year written diagnostic exam at the end of their first year of study. A second oral and written exam will be administered at the end of the third year.

To obtain detailed program curricula on the PhD in Biostatistics, please visit our website. (http://www.biostat.med.miami.edu/)

Admission Requirements

- **Application** - Applicants must submit their application online through SOPHAS (https://sophas.org/), the centralized application service of the Association of Schools and Programs of Public Health (ASPPH) (https://www.aspph.org/). All application materials, including transcripts, test scores, statement of purpose/personal statement, resume/CV, and letters of recommendations, must be submitted directly through SOPHAS. Applicants to the MD/PhD programs must apply through AMCAS (https://students-residents.aamc.org/applying-medical-school/applying-medical-school-process/applying-medical-school-amcas/).

- **Transcripts** – Applicants must submit official transcripts from all previously attended colleges and universities. All foreign transcripts must be official and submitted in the original language. If the original language is not English, an official translation must be submitted along with the transcript. We do not accept evaluations from foreign credentialing service organizations. All non-U.S. transcripts must be evaluated by the World Education Service (https://www.wes.org/) (WES) using ICAP course-by-course evaluation service.

- **Standardized Test Scores** - Applicants are required to submit a Graduate Record Exam, GRE general exam scores (http://www.ets.org/gre/revised_general/about/), taken within the last five years.

- **English Proficiency Exam** - International students whose native language is not English and/or did not graduate from an English-teaching institution are required to submit TOEFL (https://www.ets.org/toefl/) or IELTS (https://www.ielts.org/en-us/) scores.

- **Resume/Curriculum Vitae** – Applicants must include a detailed resume including employment, public health experiences, community service, research, and academic or professional honors.

- **Statement of Purpose/Personal Statement** – Applicants are required to submit a statement of purpose that details their academic interest in the program. The statement should discuss any experiences in public health including field experience, research, training, education or other related qualifications. Applicants should discuss how earning the degree will contribute to their future professional and career goals, as well as to the future of public health. Applicants should also address any academic deficiencies, if applicable.

- **Letters of Recommendation** – Applicants must provide three letters of recommendation from individuals who are best able to assess their ability to be successful in a graduate degree program. Ideally, recommenders are recent professors, researchers or employers in a related field. Letters must be signed and on letterhead. Applicants will be asked to include the contact information of their recommenders on the SOPHAS application and recommenders will be sent an online form to complete via email.

For more information about our application process, please click here (https://graduatstudies.publichealth.med.miami.edu/admissions/application-process/). To obtain detailed curricula on all our program offerings, please visit our website (http://publichealth.med.miami.edu/).

For further information, please contact:

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Miami, Florida 33136
Tel: 305-243-0291
Email: publichealthadmissions@miami.edu
# Curriculum Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
<td><strong>Core Courses</strong></td>
<td></td>
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</tr>
<tr>
<td>MTH 624</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>MTH 625</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>MTH 642</td>
<td>Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EPH 600</td>
<td>Introduction to the Science Practice of Public Health</td>
<td>3</td>
</tr>
<tr>
<td>BST 610</td>
<td>Introduction to Statistical Collaboration</td>
<td>3</td>
</tr>
<tr>
<td>EPH 621</td>
<td>Fundamentals of Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>BST 630</td>
<td>Longitudinal and Multilevel Data</td>
<td>3</td>
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<tr>
<td>BST 640</td>
<td>Modern Numerical Multivariate Methods</td>
<td>3</td>
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<tr>
<td>BST 650</td>
<td>Topics in Biostatistical Research (^1)</td>
<td>4</td>
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<tr>
<td>BST 665</td>
<td>Design and Analysis of Clinical Trials</td>
<td>3</td>
</tr>
<tr>
<td>BST 676</td>
<td>Introduction to Generalized Linear Models</td>
<td>3</td>
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<tr>
<td>BST 680</td>
<td>Advanced Statistical Theory</td>
<td>3</td>
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<tr>
<td>BST 690</td>
<td>Theory of Survival Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BST 691</td>
<td>High Dimensional and Complex Data</td>
<td>3</td>
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<tr>
<td><strong>Electives</strong></td>
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<td>12</td>
</tr>
<tr>
<td>BST 830</td>
<td>Doctoral Dissertation (pre-candidacy)</td>
<td></td>
</tr>
<tr>
<td>BST 840</td>
<td>Doctoral Dissertation (Post-Candidacy)</td>
<td></td>
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<td><strong>Total Credit Hours</strong></td>
<td></td>
<td>67</td>
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\(^1\) BST 650 is taken for 1 credit in Fall and Spring during the first 2 years of study

## Sample Plan of Study

Admitted PhD students are expected to take a full suite of courses including several iterations of the seminar course, a consulting practicum (or advanced computing course), and a series of four to six courses that ensure the candidate has studied a subject matter discipline within biomedical research. PhD students are also expected to take high-level courses in statistical theory, survival analysis, and high-dimensional and complex data not generally taken by MS students.

The PhD in Biostatistics program consists of 37 credits of core coursework, 6 credits of introductory public health coursework, 12 credits of electives, and 12 credits of dissertation research for a total of 67 credits to complete the degree. Students complete structured coursework (core and elective credits) during the first three years of study. PhD students are expected to pass a first-year written diagnostic exam at the end of their first year of study. A second oral and written exam will be administered at the end of the third year of study.

This is a sample plan of study. Your actual course sequence may vary depending on your previous academic experience as well as current course offerings. Students should meet with their academic advisor each semester to determine appropriate course selection.

## Year One

### Fall

<table>
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<tr>
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<tr>
<td>MTH 642</td>
<td>Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Credit Hours</strong></td>
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### Spring

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<th>Credit Hours</th>
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<tbody>
<tr>
<td>MTH 625</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>BST 630</td>
<td>Longitudinal and Multilevel Data</td>
<td>3</td>
</tr>
<tr>
<td>BST 676</td>
<td>Introduction to Generalized Linear Models</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Credit Hours</strong></td>
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### Summer

<table>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>BST 610</td>
<td>Introduction to Statistical Collaboration</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Credit Hours</strong></td>
<td>3</td>
</tr>
</tbody>
</table>
### Year Two

**Fall**
- BST 665 Design and Analysis of Clinical Trials 3
- BST 650 Topics in Biostatistical Research 1
- BST 640 Modern Numerical Multivariate Methods 3
- Elective Coursework 3

**Spring**
- BST 650 Topics in Biostatistical Research 1
- BST 691 High Dimensional and Complex Data 3
- BST 680 Advanced Statistical Theory 3
- Elective Coursework 3

**Summer**
- BST 830 Doctoral Dissertation (pre-candidacy) 1

### Year Three

**Fall**
- EPH 621 Fundamentals of Epidemiology 3
- Elective Coursework 3
- Elective Coursework 3
- BST 650 Topics in Biostatistical Research 1

**Spring**
- BST 690 Theory of Survival Analysis 3
- BST 650 Topics in Biostatistical Research 1
- BST 830 Doctoral Dissertation (pre-candidacy) 1

### Year Four

**Fall**
- BST 830 Doctoral Dissertation (pre-candidacy) 1

**Spring**
- BST 830 Doctoral Dissertation (pre-candidacy) 3

### Year Five

**Fall**
- BST 840 Doctoral Dissertation (Post-Candidacy) 3

**Spring**
- BST 840 Doctoral Dissertation (Post-Candidacy) 3

**Total Credit Hours** 67

### Mission

The Doctorate Program in Biostatistics prepares students who have demonstrated excellence in mathematics, statistics, and the natural or social sciences to become research biostatisticians in academia, industry, or government positions, with a general focus on biostatistical applications, big data, and data science.

### Goals

Upon completion of the doctoral degree in Biostatistics, all graduates will be able to:
• Describe the core disciplines of public health and how they apply to improving population health
• Apply epidemiological methods to the measurement and study of population health and the prevention of infectious and chronic disease
• Develop novel statistical methodology
  • identify the limitations of existing methodology and standard techniques for adapting existing methodology to new data settings
  • identify settings where techniques beyond modification of existing techniques are necessary (i.e. new methodology)
  • use advanced theory and computation to develop new methodology for addressing research problems in scientific settings
• Analyze complex data from biomedical, medical, informatics and public health settings with subject matter collaborators using cutting edge statistical techniques
  • read, understand and use the most recent literature in biostatistics
  • formulate a plan for data gathering, data management and statistical analysis
  • carry out plan effectively to answer questions of substantive interest in scientific settings
• Communicate findings verbally (with collaborators and at conferences) and in writing (journal articles)
  • prepare a seminar for presentation to statistical audiences
  • develop the skill of learning a substantive application when working with subject matter specialists
  • integrate statistical concepts into presentations for scientific audiences in forms that they will find useful and intelligible
  • prepare clear reports, analysis plans for grant applications and statistical sections of journal articles
• Demonstrate cognate field expertise
  • develop enough knowledge in a specific subject domain to communicate easily with scientists in that domain
  • use this background to formulate new biostatistical problems to solve (the dissertation is the primary example of this)
• Teach graduate students from statistics and biostatistics and public health
  • learn how to organize a large sequence of lectures so that they follow logically and provide an overview of a topic area in statistics or biostatistics
  • combine diverse teaching techniques and materials so that students with different learning styles can master the material
• Recognize potential ethical issues and implement the concepts of ethical conduct of research

Student Learning Outcomes

• Students will demonstrate an overall knowledge and understanding of the core concepts in biostatistics, including the essential skills to conduct research in biostatistics.
• Students will demonstrate critical thinking skills, the capability to develop conjectures, and the ability to make scholarly contributions.
• Students will demonstrate mastery of research competencies.