**Proposed Change to an Existing Degree: Academic Component**

*Please answer all relevant questions below. Consultation with the appropriate Associate Provost on a draft of the proposal is recommended.*

*Using the relevant template, please submit a budget even if no additional resources are needed.*

**Title of Degree (e.g., Bachelor of Arts in History):**

PhD in Biostatistics

1. **Please provide the name, title, email address, and phone number of the primary contact person for this academic program:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Email Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howard Cabral, PhD</td>
<td>Program Co-Director</td>
<td><a href="mailto:hjcab@bu.edu">hjcab@bu.edu</a></td>
<td>8-5024</td>
</tr>
<tr>
<td>Laura White, PhD</td>
<td>Program Co-Director</td>
<td><a href="mailto:lfwhite@bu.edu">lfwhite@bu.edu</a></td>
<td>4-2833</td>
</tr>
</tbody>
</table>

2. **Please describe briefly the proposed change to the existing degree:**

   1) We propose to replace the course SPH EP713 Introduction to Epidemiology with SPH EP 770 Concepts and Methods in Epidemiology as a core course requirement for the doctoral program.

   2) We propose to change SPH BS857 Analysis of Correlated Data from an elective to a required core course for Biostatistics doctoral students.

   As a result of these changes, our doctoral program now requires 10 core courses rather than 9 as previously, a change from 35 core credits to 40 core credits. This correspondingly reduces the number of elective credits required from 29 to 24.

3. **Please provide a rationale for the proposed change to the existing degree:**

   1) Replacing EP713 with EP770. The reason for this change is that SPH EP713 (3 credits) will no longer be offered in the Epidemiology Department. After consideration of the alternate courses
available, our faculty determined that EP770 should take the place of EP713, as it is taught at
the appropriate level for our doctoral students.

2) Changing SPH BS857 from an elective to a core requirement. In the current job market, the
skills taught in Analysis of Correlated Data are valuable to our graduates, more so than in the
past. For this reason, our faculty have recommended that this course be changed to a
requirement in the program, to better prepare our graduates for the types of jobs they will
enter after graduation.

4. Please describe how the proposed change(s) advances the Strategic Plans of the
department, of the school/college, and of the University:

The Biostatistics Program regularly reassesses its curriculum in order to best prepare its
graduates for success in their careers as biostatisticians. Also, given that the Program is based
in two Schools at the University, it needs to adapt to curricular changes in both schools to
ensure that our students have the best possible course-based training. This also helps the
Program to continue our highly successful record in producing high caliber graduates within the
framework of a joint program across both the Charles River and Medical Campuses.

5. Please list all the program requirements for the current and revised programs so that
review committees can easily see the changes: (expand the table as needed and denote new
courses in bold print)

<table>
<thead>
<tr>
<th>Current program (64 credits)</th>
<th>Revised program (64 credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS MA575 Linear Models</td>
<td>same</td>
</tr>
<tr>
<td>CAS MA581 Probability</td>
<td>same</td>
</tr>
<tr>
<td>CAS MA582 Mathematical Statistics</td>
<td>same</td>
</tr>
<tr>
<td>SPH EP713 Introduction to Epidemiology (3 credits)</td>
<td>SPH EP770 Concepts and Methods in Epidemiology (4 credits)</td>
</tr>
<tr>
<td>SPH BS805 Intermediate Statistical Computing and Applied Regression</td>
<td>same</td>
</tr>
<tr>
<td>SPH BS852 Statistical Methods in Epidemiology</td>
<td>same</td>
</tr>
<tr>
<td>SPH BS853 Generalized Linear Models with Applications</td>
<td>same</td>
</tr>
<tr>
<td>GRG MA781 Estimation Theory</td>
<td>same</td>
</tr>
<tr>
<td>GRG MA782 Hypothesis Testing</td>
<td>same</td>
</tr>
<tr>
<td>29 credits from a list of electives</td>
<td>24 credits from a list of electives</td>
</tr>
</tbody>
</table>
6. Is this change a result of program learning outcomes assessment and/or academic program review? If yes, please describe:

These changes are the result of a review of the academic program by our faculty at a retreat last year. Recommendations from the full faculty were then reviewed and discussed by our Biostatistics Program Advisory Committee, who finalized the proposed changes as described above.

7. Please list learning outcomes for the revised program:

Same as previously.

A candidate for a Doctor of Philosophy degree in Biostatistics is expected to demonstrate mastery of knowledge in biostatistics and to synthesize and create new knowledge, making an original and substantial contribution to the field in a timely fashion by:

- Demonstrating mastery at a doctoral level of biostatistical theory and application through high achievement in course work and on written comprehensive examinations.
- Making an independent, original, and substantial contribution to the field of biostatistics, assessed through an oral defense of the dissertation work.
- Demonstrating commitment to advancing the values of scholarship by keeping abreast of current advances in the field of biostatistics and showing commitment to personal professional development through engagement in professional societies and publication.
- Conducting scholarly work in a professional and ethical manner guided by the principles of the profession.

8. How does the change place your program in the context of programs at peer institutions?

We feel that these changes are not only proper for our program, which is somewhat unique among our peer institutions, but also is on the cutting edge of training in our field.

9. How does the change affect other academic units and existing programs at the University?

These changes do not significantly affect other academic units or programs at the University.
10. How will you notify current students of the proposed changes and implement the requirements? How will you assure that current students are able to complete their programs under the requirements that were in place at the time of their matriculation?

All current students were provided with their own individualized course schedule and program at the time of matriculation; those students will continue to follow those individual plans, which will not be impacted by these changes to the program for new students. They will be aware of the changes, as the changes will be published on our website and in our student handbook for next year, but the program changes will only apply to students starting in F17 and later.

11. Please document any implications that the change has on professional accreditation or licensure at the program or school/college level:

There are no implications for professional accreditation or licensure.

12. If the change includes a new course or courses, please indicate who will teach the course and how the rest of that faculty member’s course load will be affected (courses(s) redistributed to other faculty, taught less frequently, no longer taught, etc.). Please be specific about affected courses. This information should be reflected in the budget form that accompanies the proposal, e.g. the cost for a new faculty member to teach the new course or a redistributed course:

The new course, SPH EP770, is taught in the Epidemiology Department and has been approved as a new course in their curriculum following the changes to the Master of Public Health program. It will be taught at a level that appropriate for our Master’s and Doctoral students in the GRS Biostatistics Program.

13. Please list other resources needed including new staff, IT, technology enhanced classrooms, office space, and other facilities. This information should be reflected in the budget:

None.

14. Please describe the budgetary impact that the proposed change will have:

None.
PhD in Biostatistics

The PhD in Biostatistics program is geared toward the graduate student who seeks a career as a professional, academic, or industrial biostatistician in biomedical or epidemiologic sciences. The program meets the needs of the health professional who wishes to continue with public health training and achieve a higher and more specialized degree as well as the statistician who wishes to specialize in statistical methods for biomedical or epidemiologic applications.

Course Requirements

Students must successfully complete all core courses no later than three years after matriculation. Students must earn a minimum grade of B- in all courses in order to receive credit toward the degree.

Students must complete a total of 64 credits. Course requirements are as follows:

- CAS MA 575 Linear Models
- CAS MA 581 Probability or MET MA 581 Probability
- CAS MA 582 Mathematical Statistics or MET MA 582 Mathematical Statistics
- SPH EP 770 Concepts and Methods in Epidemiology
- SPH BS 805 Intermediate Statistical Computing and Applied Regression Analysis
- SPH BS 852 Statistical Methods in Epidemiology
- SPH BS 853 Generalized Linear Models with Applications
- SPH BS 857 Analysis of Correlated Data
- GRS MA 781 Estimation Theory
- GRS MA 782 Hypothesis Testing
- A minimum of 24 credits selected from the list of electives on the program website

Language Requirements

There is no foreign language requirement for this degree.

Qualifying Examinations

The doctoral candidate must satisfactorily pass two comprehensive written examinations upon completion of coursework. These will require proficiency in the material covered in the ten core courses. Students are allowed two attempts to pass a qualifying exam. The Biostatistics Qualifying Exam Committee will evaluate requests by students to take an exam for the third time on a case-by-case basis. Students must pass at least one qualifying examination no later than three years after matriculation and pass both exams no later than four years after matriculation.
Dissertation and Final Oral Examination

Candidates shall demonstrate their abilities for independent study in a dissertation representing original research or creative scholarship. A prospectus for the dissertation must be completed and approved by the readers, the director of graduate studies, and the department chair/program director. Candidates must undergo a final oral examination in which they defend their dissertation as a valuable contribution to knowledge in their field and demonstrate a mastery of their field of specialization in relation to their dissertation. All portions of the dissertation and final oral examination must be completed as outlined in the GRS General Requirements for the Doctor of Philosophy Degree.

Teaching Requirement

As of fall 2016, one semester of teaching has been added as a curriculum requirement for the PhD program. Students must complete the teaching requirement before defending their dissertation. Students complete the teaching requirement by working as a Teaching Assistant or Co-Instructor for a Biostatistics course for at least one semester.

Doctoral Student Research Presentations

Doctoral student research presentations are held twice a month throughout the academic year. Students who have completed coursework and have passed their qualifying examinations must present the status of their thesis work in at least one seminar per year and attend at least three other research presentations each semester. There are no exceptions.

In addition, students are required to complete at least one paper based on their dissertation that is ready to submit to a peer-reviewed journal for consideration of publication, and be listed as first author. The article must conform to the requirements of a specific statistical or otherwise appropriate journal.

Students who were accepted into the PhD program and have not received a Master of Arts (MA) degree from the Biostatistics Graduate Program can apply to do so, if they have completed 32 credits of courses (as required for the MA) and have passed both the Applied and Theory Qualifying Exams at the master’s level, as determined by the Biostatistics Qualifying Exam Committee.