BROWN
Public Health

DEPARTMENT OF BIOSTATISTICS
121 South Main Street
G-S121-7
Providence, RI 02912

Biostatistics Program Handbook 2024-2025

Table of Contents

1. BIOSTATISTICS AT BROWN

Graduate Study in Biostatistics

Biostatistics is a highly dynamic and rapidly expanding field of study. By developing new quantitative methods, characterizing underlying theory, and making innovative applications to substantive and demanding scientific problems, biostatisticians play a central role in the advancement of biomedical and public health research. Demand for advanced expertise in biostatistics continues to be high in academia and in the public and private sectors, particularly in settings emphasizing research in biomedicine and biotechnology.

The Graduate Programs in Biostatistics offers courses of study leading to the Doctor of Philosophy (PhD) and Master of Science (ScM) degrees, as well as the Master of Arts (AM) degree for 5th-year and Open Graduate Education (OGE) for Brown students. The Department of Biostatistics also oversees the College's Undergraduate Statistics Concentration.

The **doctoral program** is designed to train independent researchers who will develop new quantitative methods and underlying theory and make innovative applications to substantive and demanding scientific problems in public health, medicine, biology, and the social sciences. The program emphasizes theory, methods and applications of biostatistics that are central to modern interdisciplinary research.

The **Master's programs** provide advanced training in the theory and application of statistical methods in public health, clinical medicine, and the biological sciences. The Master's degree program is designed to provide advanced training for a heterogeneous audience that includes individuals pursuing careers as professional statisticians or data analysts in industry, government or academia; those contemplating doctoral study in biostatistics; and established researchers seeking advanced training in biostatistics. For Brown undergraduates, we offer a **fifth-year Master's (AM) degree** that can be completed in one year after receiving the bachelor's degree. The AM degree program is also open to Brown Graduate students pursuing a master's degree in a secondary field through the University's **Open Graduate Education Program (OGE)**.

1.1 Department Requirements for all Graduate Program Students

Individual Development Plan

The Brown University School of Public Health requires that all students complete an Independent Development Plan (IDP) and that compliance is monitored by home Departments. The IDP is a valuable tool that gives students the opportunity to address their short-term and long-term career goals. IDPs are also an NIH mandate for students working on NIH-funded research projects. The Department views the IDP as an important opportunity to review progress with the student's advisor, set academic and research goals for the coming year, and update the academic CV.

The Department of Biostatistics requires all graduate students to complete an IDP each calendar year.

Scope of Public Health Course Requirement

The School of Public Health has developed an online non-credit modular course covering the scope of public health (PHP1001). The course satisfies the requirements that students receive instruction in the breadth of public health and have the equivalent of a three credit-hour course in epidemiology. There is no charge for the online course. The course presents one module at a time; three in the fall and three in the spring semesters. Each module comprises 3-5 sessions, each created by a Brown faculty member. Modules are set up to run for one scheduled week per session, during which the faculty member for that session will be available for questions using an online discussion. However, students can complete the module at their own pace, though faculty will not be available outside of their scheduled week. If a student can document that they have both of these two requirements from previous coursework, a waiver can be granted by the degree program.

Participation in School of Public Health Research Day

An invaluable result of educational training is the ability to coherently and succinctly articulate research and subsequent findings to statistical and non-statistical colleagues. To that end, PhD students who have successfully completed the written qualifying exam and 2nd-year Master's students on the ScM track are required to participate in the School of Public Health Research Day Poster Session held each April. The identified rationale for this academic requirement is to:

- Develop proficiency in making oral, written and poster presentation of work to statistical and non-statistical colleagues.
- Communicate effectively with public health experts, relying upon a basic understanding of human health and disease.

1.2 Research in Biostatistics and Public Health

The Graduate Program is administered by an active, expanding and highly interdisciplinary faculty in the Department of Biostatistics in the School of Public Health. Major areas of research activity include analysis of biomarkers and diagnostic tests, causal inference and missing data, time series and functional data analysis, spatial data and network analysis; microsimulation, predictive models, bioinformatics, longitudinal data, meta-analysis, clinical trials and multilevel modeling. Faculty collaborate actively with investigators in cancer prevention and screening, behavioral sciences, HIV/AIDS, health care policy, research synthesis, genetic epidemiology, neuroscience, genomics and clinical and translational research. Biostatistics faculty are members of the Center for Statistical Sciences (CSS), which hosts the Biostatistics Methods and Data Center for the NCI-funded Eastern Cooperative Oncology Group-American College of Radiology Imaging Network
(ECOG-ACRIN), the Biostatistics Core for Brown's Center for AIDS Research, the Biostatistics Core for Brown's multidisciplinary Alcohol Research Center for HIV (ARCH), the Biostatistics, Epidemiology and Study Design (BERD) Core of the Advance Rhode Island Center for Clinical and Translational Research ; and of the Center for Evidence Synthesis in Health (CESH) which hosts the Brown Evidence Based Practice Center funded by the Agency for Healthcare Research and Quality.

The Department is located at Brown's rapidly expanding **School of Public Health** in the heart of downtown Providence, just blocks from the main green and walking distance to several of Brown's research centers. Its other educational programs include graduate programs in Epidemiology, Behavioral and Social Sciences Intervention, and Health Services,

Policy and Practice in addition to an MPH program, and undergraduate concentrations in both Community Health and Statistics. The School of Public Health is home to several world-class research centers, such as the Center for Gerontology and Health Services Research, the International Health Institute, and the Center for Alcohol and Addiction Studies. Our faculty also hold joint appointments and collaborate with researchers at Brown's Centers for Behavioral and Preventive Medicine; Center for Computational Molecular Biology; Center for Genetics, Genomics and Proteomic; Population Studies Training Center; Carney Institute for Brain Science; and the Data Science Institute.

1.3 Resources for Biostatistics Students

University Resources

Student and Employee Accessibility Services (SEAS): Services are available for anyone with a disability or other condition that may require accommodations or modification of course procedures. Registration should be made with SEAS and the program's graduate director should be informed. Contact SEAS at (401)863.9588 or SEAS@brown.edu

Student Support Services are available through the Office of Student Life; Counseling and Psychological Services (CAPS) provides free confidential counseling. Maria Suarez, Associate Dean of Student Support in the Graduate School, is dedicated to serving Master's and PhD students and can be reached at the Graduate School located at Horace Mann, 110. (maria_suarez@brown.edu or 401.8673.1802).

Department Resources
All students are provided with office space within the School of Public Health. Master's students have access to shared office space.

The Department provides incoming doctoral students with a new laptop computer for use while enrolled in the doctoral graduate program. While the Department will fund the initial laptop purchase, each student will be responsible for any needed repairs, replacement parts, upgrades, etc. As different components of the laptop are subject to different warranty periods, students should always check with the School of Public Health's Information Technology staff for any possible component warranty before making a purchase or requesting repair. Temporary loaner machines for a student's use in the event of laptop repair may be available through the Department or the School. Laptops remain the property of Brown University; therefore, when a student leaves the program for any reason, the laptop must be returned to the Department.

All students have access to the computing infrastructure at CSS, a high-end, continuously updated **computing environment** featuring both Unix and PC networks, with access to all major software for data analysis and numerical computing. CSS also maintains a considerable collection of statistics texts and journals in the **Walter Freiberger Biostatistics Library.**

Other resources include the Department's website site maintained specifically for our Biostatistics students, who are encouraged to visit the site regularly.

Department Computing Security
Brown University, the Department of Biostatistics and the Center for Statistical Sciences takes computer security very seriously. Brown University has a policy which forbids the sharing of your username and password. Brown's Computing & Information Services (CIS) has additional policies regarding acceptable use, handling of restricted information, confidentiality, copyright infringement, and many other issues that are important to computer safety and data security. Please take the time to familiarize yourself with the University's CIS policies.

CSS runs a closed network behind a secure, Center-run firewall. Students are provided access to this network to perform tasks, carry out research work, and access data under the direction of their advisor. Under no circumstances should students of Biostatistics share their CSS username and password (which is different from Brown credentials) with anyone inside or outside of the Department. IT staff will never ask you for this secured password. Furthermore, students may not log others into any CSS computer with their own credentials.

Students should be responsible and act with security in mind when accessing the CSS closed network and the data within. Violations of these policies could be cause for removal of the offender's access.

Conference Travel Funds
Both the University's Graduate School and the School of Public Health have policies allowing for graduate students to apply for funds to cover related travel expenses when presenting original work at academic conferences.

In consultation with the student's academic or research advisor, approval will be sought from the Biostatistics PhD or Master's Graduate Program Director. Once approved, students should follow up with the Department Student Affairs staff. Students should inform the Department's administrative staff of all presentation invitations, travel award requests and subsequent receipt of awards.

1.4 Seminars and Working Groups

Brown Statistics Seminars
The Center for Statistical Sciences and the Department of Biostatistics organize a regular Statistics Seminar series throughout the Fall and Spring Semesters. The seminars are a forum for active researchers in statistics and biostatistics to present new and ongoing work on methodology and application. In addition to a formal presentation, speakers spend the day of the seminar meeting with individual faculty and students. The Center also has been awarded grants from the University to support thematic lecture series that feature nationally and internationally recognized researchers. Topics of past series include meta-analysis, statistical genetics, analysis of spatial data, causal inference, neuroimaging and bioinformatics. Typically, the Biostatistics Seminars are held on Monday afternoons during the school year. The full schedule for the seminar series and archived content can be found on our Seminar webpage

All Biostatistics graduate students are encouraged to attend these seminars and lectureships. ***All PhD students are required to attend***. Student notifications are sent out on a regular basis.

Working Groups
Faculty in Biostatistics periodically will organize themed working groups; students should inquire and feel welcome to attend. Students also should consider organizing their own working groups.

Seminars in other departments
Students are encouraged to attend seminars in other departments around Brown. Biostatistics students may be especially interested in those offered by the Departments of Applied Math, Computer Science, Economics, Epidemiology, Neuroscience and Sociology; and by various Centers and Programs such as Computational Molecular Biology, Spatial Structures in the Social Sciences, Population Studies Training Center, and the various centers affiliated with the Program in Public Health and the Division of Biology and Medicine.

2. DOCTORAL PROGRAM

Introduction

The primary mission of the doctoral program in Biostatistics is to provide the training necessary to carry out independent research in the theory, methodology and application of statistics to important problems in biomedical research, including research in biology, public health and clinical medicine. All students in the doctoral program in Biostatistics are required to demonstrate mastery of advanced biostatistical methods, which is assessed via coursework and examinations.

The Graduate School has several University-wide requirements for all students enrolled in graduate programs at Brown. Both students and advisors are expected to become familiar with these. They can be accessed on-line at:
http://www.brown.edu/academics/gradschool/phd-programs

Within the Department of Biostatistics, the major requirements for the PhD are:

1. completion of a program of courses covering core areas of required expertise
2. demonstration of proficiency in teaching
3. synthesis of a core body of knowledge, evaluated via written examination
4. demonstration of readiness to undertake original research, via oral presentation and defense of a written dissertation proposal (oral exam)
5. completion and oral defense of a dissertation that makes an original contribution in the chosen field of study.

2.1 Course of Study

Competencies in biostatistics are divided into four core areas: theory and foundation of statistical inference, general biostatistical methods, advanced training in specialized domain areas, and foundation in public health.

Owing to the inherently interdisciplinary nature of biomedical research, students in Biostatistics are also required to demonstrate competency in a substantive field of application; examples include (but are not limited to) genetics, economics, demography, molecular biology, epidemiology, infectious diseases, and cancer biology. This competency is demonstrated via successful completion of at least one graduate course (1000 or 2000 level) in another department or graduate program. The selection of this course must be approved by the Graduate Program Director.

Specific course requirements are as follows (courses taken at other institutions can be used to meet one or more course requirements):

Course Content

Required courses:

PHP 2520	Statistical Inference I
PHP 2530	Bayesian Statistical Methods
PHP 2550	Practical Data Analysis
PHP 2580	Statistical Inference II
PHP 2601	Linear Models
PHP 2605	Generalized Linear Models
PHP 2602	Analysis of Lifetime Data
PHP 2610	Causal Inference and Missing Data
PHP 2950	PhD Journal Club * (see Page 17 for details)
PHP 1001	Public Health Overview (No credit, see Page 3 for description)
PHP 2120	Introduction to Methods in Epidemiologic Research

Electives: (take at least 5, including at least 2 from biostatistics, 1 in substantive field of application)

PHP 2030	Clinical Trials Methodology
PHP 2603	Analysis of Longitudinal Data
PHP 2604	Statistical Methods for Spatial Data
PHP 2620	Statistical Methods for Bioinformatics
PHP 2650	Statistical Learning and Big Data
PHP 2690	Advanced Topics in Biostatistics
PHP 2590	Design of Experiments
PHP2670	Simulation Models for Public Health Decision Making
APMA 1160	Introduction to Numerical Optimization
APMA 2610	Recent Applications of Probability/Statistics
APMA 2630	Probability Theory I
APMA 2640	Probability Theory II
APMA 2821	Stochastic Processes on Graphs
APMA 2811	Convex Analysis + Minimization Algorithm
CSCI 1470/ 2470	Deep Learning

Qualifying Courses in other departments (APMA, ECON, CS), with approval from the Graduate Director

Additional requirements:

Annual Research Presentation

Students who have passed the written qualifying exam are required to present their research in the annual presentation event. This is usually research related to their thesis, but presentations on other topics are accepted as well. Students who have not passed their written qualifying exam may elect to participate in the presentation, but are not required to.

Responsible Conduct in Research Training

Transfer Credits

Graduate-level academic credit earned outside of and prior to a student's current degree program at Brown may accelerate the time to the completion of the tuition unit requirement of the degree. PhD students may transfer up to 8 courses. Only advanced coursework taken while the student was a graduate student either at Brown or another institution may be used for graduate credit at Brown. For details, refer to the Graduate School Handbook.

Approximate Timeline for Completing the PhD

Semesters 1 to 4:	Coursework
By summer after second Semester	Complete Written Qualifying Exam
After Passing Written exam:	Begin process of selecting research topic, dissertation advisor and committee
By end of Semester 4: (No later than end of semester 5)	Complete Oral Qualifying Exam
Semesters 6 and beyond:	Dissertation work
No later than beginning of	Schedule Thesis Defense

2.2 Advising and Mentoring

At the time of admission into the program, each student is assigned a faculty academic advisor. During the first two years of study, the academic advisor assists the student in planning for meeting degree requirements and objectives and in the process of course selection. The academic advisor is expected to be familiar with the student's academic background, particularly with respect to previous graduate coursework. The assignment of an academic advisor is made by the Graduate Program Director.

Students should plan to meet with their academic advisor two to three times per semester. In the initial meetings with the academic advisor, students should try to plan a curricular program for up to two years. It is not necessary that this initial plan be adhered to throughout the two-year period but it gives a rough outline of courses to be taken and milestones to be met.

The advising relationship is an important one and students should be comfortable with their advisor. It is understood that in some cases an individual student may wish to change academic advisors. This can be done at any time by petitioning the Graduate Program Director. It is expected that if any problems or conflicts arise, students will discuss these first with their academic advisor, but may also contact the Graduate Program Director.

2.3 Qualifying Exams

Written Exam

The purpose of the written exam is to assess basic readiness to pursue doctoral-level research by testing the student's ability to synthesize and apply major theories and methods of inference and analysis.

The written exam has two parts**. Part 1, on Theory and Methods of Biostatistics**, is a closed-book, in-class exam that covers material drawn primarily from the courses offered during the student's first year. Time provided for Part 1 can be between 4-6 hours. **Part 2, on Applications of Biostatistics**, designed to test facility with data analysis and scientific writing, is a take-home exam in which the student must prepare and describe an analysis of a faculty-supplied dataset. In this part of the exam, students may consult outside reference material but must work alone.

Coursework during the first two semesters will frequently, but not always, correlate with the core material tested on the exam. Students should consult the reading list given below. Samples of previous exams are available from the Department's Administrative Coordinator.

Students must pass both parts of the exam in order to progress toward PhD candidacy, and may attempt each part of the exam two times. Each part of the exam is graded separately. Both parts must be taken on the first attempt. If a student does not pass, one or both parts may be re-taken.

The exam will normally be offered once each year, typically at the end of the student's 2nd semester (June of each year) with a 2nd exam given only for students who did not pass the first time around and request a second exam. A second exam, if needed, would take place at the next regularly-scheduled exam time.

Faculty from the appropriate track will write and grade the examination. Following the grading process, the faculty within each track meet to discuss each student's performance and collectively decide on a recommendation. The recommendations will ordinarily be communicated to students within two weeks. Recommendations take one of three forms: *full pass, conditional pass,* and *not pass.*

Students who earn full pass on both portions of the required written examinations are eligible to begin the dissertation process (selecting advisor, preparing thesis proposal, etc.). Students who earn a conditional pass may also be eligible to begin the dissertation process but may be required to remedy any stated deficiencies (e.g. through directed self-study). Students who do not pass a portion of the written examination on the first attempt have one additional opportunity to earn a pass or conditional pass on that portion, provided that the student is otherwise in good or satisfactory standing in the program. Those who elect to retake the exam must do so at the next offering. For full-time students, the written qualifying examination should generally be completed successfully no later than the end of the student's fourth (4th) semester.

Selecting a Dissertation Chair/Advisor

After a student has passed the written qualifying exams, the student selects a dissertation chair and committee to oversee the student's thesis research. Students enrolled in the PhD program must pass their written examination prior to selecting a dissertation chair and committee and progressing to the oral examination. However, we encourage students to learn about the research interests of various faculty members to gather information about prospective advisors well in advance of completion of the written exams.

Any member of the graduate faculty may serve as a doctoral thesis advisor. We recommend the following guidelines when selecting such an advisor:

1. Ask someone who has experience in the area you are interested in studying.

2. Ask someone who is able to make a commitment to be your mentor. Clarify expectations from the beginning with this person in terms of time and substance. Students who have established ongoing relationships with their advisors as research and/or teaching assistants have more opportunity for mentoring. Your initial academic advisor may assist you in the process of doctoral advisor selection.

3. Take into account the availability of funding when choosing an advisor. In the majority of cases, funding for doctoral students is arranged by and in conjunction with their doctoral thesis advisor.

Your advisor provides ongoing supervision and consultation for the conceptualization, design, conduct, analysis and interpretation of the research project. Most advisors will engage you in scientific activities beyond your thesis, for example, presenting talks at university seminars and scientific meetings, assisting with manuscript reviews, and collaborating on other research projects.

Students in the doctoral program are required to successfully complete the written qualifying examination and the oral qualifying examination that is conducted in conjunction with the presentation and approval of their thesis proposal. Eligibility for writing a doctoral thesis (or, entering "candidacy") is based on successfully completing a written examination and oral examination.

Composition, Selection and Function of the Dissertation Committee

Students should begin the process of selecting members for the dissertation committee as soon as the written qualifying exams have been successfully completed. The minimum size of a doctoral committee is three faculty members. More members may be preferable to have.

On the other hand, more than four members may become administratively complicated and challenging for the student who may feel compelled to respond to differing, and at times conflicting, advice.

The committee must include two faculty members from the Department of Biostatistics. The third member should be an external faculty with an affiliation with another department within Brown. Additional committee members from other institutions may also be included. Final composition of the committee must be communicated to the Graduate Program Director and approved before the oral examination of your thesis proposal.
Students should discuss selection of committee members with their advisor. Although interactions with committee members will vary considerably by individual, the minimal expectation of the committee is to evaluate and provide feedback at regular intervals during the preparation of the dissertation. Committee meetings should be scheduled on a regular basis, at least once a semester, to ensure this.

Once you have come up with a list of potential committee members, contact each one to inquire into their willingness to be on your committee. In some cases, your advisor may be in the best position to make the request of some faculty members. If the potential committee member is interested, set up a time to discuss expectations and their role as committee members. Inform each faculty member of the desired composition of your committee, and ask for referrals to other potential members if you feel that you do not have enough expertise represented.

The dissertation and oral examination committee must be approved by the appropriate Graduate Program Director before membership is finalized. Students should send a memo to the appropriate Program Director listing the names and department affiliation of each member, including the proposed chair of the oral examination committee. The chair of the oral examination will typically not be the Dissertation Chair. Once approved, the Program Directors will send a memo to the student, the committee members, and the Academic Program Manager.

Outside Reader(s)

The Biostatistics Graduate Program suggests that each student identify an outside reader for the dissertation. The outside reader is typically selected at the same time as the dissertation committee, and the selection should be done in consultation with your advisor. An outside reader is someone external to Brown who has recognized expertise in the topic of your research. Frequently the reader will be a colleague of the dissertation advisor and/or one or more committee members.

Officially, the outside reader will function as a consultant to the dissertation committee, providing periodic feedback on the student's progress and offering suggestions for revision of manuscripts and/or proposals. The outside reader will also be asked to offer an opinion about the quality of scholarship evident in the thesis as it develops. In some instances, there may be separate outside readers for different aspects of the dissertation who review a subset of the thesis papers. Importantly, the outside reader does not vote on the final acceptance of the thesis and will not provide direct official feedback regarding student progress. The committee will serve as an arbiter of the reader's suggestions and use the reader's feedback at its own discretion.

Oral Exam

Biostatistics doctoral students should complete the oral exam within the next academic year following passage of the written exam.

Required Departmental documentation includes:

Dissertation Committee Confirmation Form
Dissertation Committee Oral Exam Request Form
Dissertation Defense Information Form

These documents can be obtained from the Department Coordinator and must be retained for the student's file. Following completion of the Oral exam, a Dissertation Committee-Oral Exam Results Form is required to document the outcome. (These documents can be found in Appendices B1, B2, B3 and B4).

The goal of the oral exam is to determine how well the student can define important scientific questions and devise creative and innovative approaches to answer them. The oral exam consists of two parts:

Written proposal: The proposal should be delivered to members of the dissertation committee two to three weeks prior to the date of the oral exam. The body of the proposal (excluding references, figures, etc.) should be about 30 double spaced pages. The proposal should roughly follow the style of an NIH grant proposal, according to the following outline:

1. Summary of the proposal that includes the specific aims of the work to be done (1-2 pages).

2. Background and literature review. Describe the previous work done in the field that leads up to the scientific problem you are addressing. Raise questions about or indicate gaps in existing work that your dissertation will address. This step is crucial to establishing that your work will be original and innovative (5-7 pages).
3. Preliminary studies. Describe what work you have done, if any, that supports the proposed project (4-5 pages).
4. Proposed work (~15 pages). This section is the most important of your proposal and probably should be longer than each of the other three. It should describe the proposed work and give an outline for the three thesis papers. It is expected that the outline and preliminary work for the first and possibly second paper will be more well-developed than for the third. Essentially this section needs to answer the questions: What do you plan to do? Why is it important? How do you plan to do it? What are the expected pitfalls and how might you approach them? If successful, where will your work lead in the future?

Oral Examination: For the oral exam the student must prepare an oral presentation of the proposed work, using slides as necessary. The oral examination will be attended by the thesis committee. The exam will be chaired by a committee member other than the dissertation advisor. The defense begins with an oral presentation of about 30 minutes. Committee members will then direct questions to the candidate. The questioning process can take up to 90 minutes. Students should be sure to practice the presentation beforehand so that it does not exceed the 30-minute allotment. Most importantly, students should realize that the committee has read the proposal, and try to focus on the research plan and its importance, rather than reiterating the background material. Feedback from the oral exam can be very helpful for developing the thesis project.

Evaluation: The chair of the oral exam will summarize the discussion and the outcome of the exam in a written memo to the candidate. The written proposal and oral exam will be evaluated for their content, plan, presentation, and defense. The evaluation results are the same as for the written exam: full pass, conditional pass and not pass. Those earning full pass are admitted to PhD candidacy. Those earning conditional pass may either be asked to retake the oral exam or to address significant deficiencies in the proposal. In this case, the committee must agree that any shortcomings have been adequately addressed before the student is admitted to candidacy. A 'not pass' means the student may be directed to re-take the oral exam altogether, or may be declined candidacy to the PhD degree.

2.4 Dissertation Process

Upon completing the proposed research, students schedule a public presentation and defense of their dissertation through the Biostatistics Department administrator and following procedures stipulated by The Graduate School. The following website also provides instructions for preparing and presenting the PhD dissertation: http://www.brown.edu/academics/gradschool/academics/rules-regulations/dissertation- guidelines

Students should contact the Graduate School for clarification of any instructions and to let it know of the preparation to defend.

Agreement by all committee members and the Program Director to schedule the thesis defense is obviously a strong predictor of approval of the doctoral thesis. However, the final approval of the thesis is made after the student's presentation.

At least three to four weeks in advance of the defense, the student must provide the Graduate Program administrators in the Department of Biostatistics the title of the dissertation talk and arrange a date and location for the defense. The student must also contact the Graduate School to make an appointment for submission of the complete dissertation. In addition, the Graduate School needs to have the following:

1. A copy of the title page, bearing the notation "approval of semi-final version" (typed or

handwritten somewhere on the title page) and the signature of the advisor.
2. Names of readers and their addresses if they are not at Brown.
3. Date, time and place of the defense.
4. Student mailing address and telephone number.
5. Previous degrees and dates of receipt.
6. Date of preliminary examination (written and oral).

Committee members should receive the penultimate draft of the thesis sufficiently far in advance of the scheduled defense to allow for reading and preparation of questions; two to three weeks is recommended.

At the conclusion of the presentation, the thesis committee will meet in private to make a final determination of the acceptability of the thesis and discuss any changes for the final version.

The University Graduate School requires all PhD dissertations to be completed toward the end of April for a May graduation. *Students who do not hand in their final thesis on time cannot participate in the University's graduation exercises, but are welcome to participate the following year*.

When the thesis is presented to the Graduate School, it must be in final form. It must be filed electronically. It may not be revised in any way after it is presented. In addition to providing the Graduate School with the required electronic copy of the PhD dissertation, the student must also provide a bound copy of the dissertation to the Biostatistics Department as well as to each committee member who requests one.

2.5 Other Requirements for Doctoral Students

Research

Involvement and participation in research is an academic requirement for all PhD students. A research advisor should be identified and requested from the Biostatistics faculty or from a related academic department or Public Health center or institute. Students should discuss options with their Academic Advisor or the PhD Program Director if necessary.

Research Assistant Opportunities

Students in Biostatistics participate in Research Assistantships (RAships) in a variety of on and off campus settings, including the Center for Statistical Sciences, the Center for AIDS Research, the Center for Evidence-Based Medicine and other Public Health Research Centers in addition to clinical departments at Brown-affiliated hospitals. This section of the handbook is meant to provide a set of uniform guidelines that apply to RAs in all settings.

Purpose of the Research Assistantship

An RAship ideally should be an integral part of the student's training program. It provides a means of financial support, experience with academic research in a field relevant to the student, and provides faculty investigators with support in the form of graduate student participation on their projects.

Role of the RA advisor

The RA advisor is responsible for supervising and directing the student's work during the term of the appointment. Frequently, the faculty member providing the financial support for the RA position will serve as the advisor, but another faculty member can be designated (note: the advisor must be a faculty member). The RA advisor is responsible for coordinating, scheduling, and keeping appropriate documentation on the RA's activity; this is a particularly important function on large projects where the RA may be working with several different faculty and staff members. The advisor also will be solicited for formal feedback as part of the twice-yearly evaluation of students.

Role of the student

The student is responsible for working on the assigned project for an average of 20 hours per week. The advisor and student must work together to ensure that both academic and RA responsibilities are being met.

Duration of the appointment

Doctoral appointments typically last a minimum of 4.5 months and a maximum of 12 months and are subject to renewal. Students are not expected to work during any of the official Brown holidays. Students should coordinate time off with the RA/TA supervisor in advance.

Work Location of the Appointment

The Department expects that RAship activities will be completed within the United States, specifically in one of the states or cities where Brown is authorized to employ individuals and withhold taxes. Brown is not an authorized employer in other countries. If an individual is working for Brown but located in another country, both the University and the student are at risk of violating tax law in that country. Further, individuals being paid from sponsored funding may also be subject to additional restrictions around working outside of the United States. Please consult with your Program Director and Department Manager, if further guidance is needed.

If RAship duties requires a doctoral student to work abroad (e.g., for data collection) or travel abroad while completing RAship duties is necessary for extenuating personal circumstances, then RAship duties can be completed abroad for a short period of time (i.e., 45 days or less). Written approval must be obtained from the Doctoral Program Director before RAship duties can be completed abroad. To request this approval, the student must email the Program Director and the Academic Manager with the reason for the request, the country in which the RAship duties will be completed, and the dates the student will be completing RAship duties abroad.

Publications and academic freedoms

Although the RA's role in generating manuscripts for publication may vary by individual setting, it must be recognized that, consistent with academic norms, those who contribute intellectual content must be given appropriate credit. Being an RA as opposed to being an investigator is not grounds to preclude authorship. RAs who contribute meaningfully to a research project should be offered the opportunity to participate as a coauthor in publications, even if the RAship has been completed at the time the manuscript is being prepared. RAs should notify and work with the RA advisor directly should they wish to initiate preparation of a manuscript for publication based on a project or data associated with the RAship.

Special consideration for students engaged in dissertation work

Students engaged in PhD thesis research should, when possible, be matched to an RAship that is closely related to their field of research, to the point that some of their work as an RA may eventually result in a first-author published manuscript.

Awarding of industry-sponsored RAships and Internships

Student's who wish to engage in outside Internships or industry-sponsored Research Assistant positions must be in good academic standing. It is recommended that any outside RA or internships take place following the passage of the student's Oral Exam and is to be discussed and approved with the student's advisor. Industry-sponsored RAships will be classified by the department as 'Sponsored Fellowships' and will be awarded to students based on mutual agreement by the student, the sponsoring organization, and the Graduate Program Chair. The industry sponsor should submit a description of the Sponsored

Fellowship to the Graduate Program Chair for review and approval before it is made available as a means of support.

The process of awarding Sponsored Fellowships follows the guidelines, including timeline, publications, and terms of appointment as the awarding of other RAships. Sponsors of off campus RAs should factor travel time into the student's overall time commitment, and be prepared to defray appropriate travel expenses.

Specific guidelines for off campus RAships

All RAships awarded to Biostatistics graduate students must be directly supervised by a full-time Brown faculty member. When the supervisor is not a member of the Department, a faculty liaison, who is a Department faculty member, will be assigned to oversee the RAship broadly. In many cases this liaison can be the student's academic advisor.

Teaching

PhD students are required to develop experience and expertise in teaching. This is typically 16 accomplished through teaching experiences in departmental courses taught by the Biostatistics faculty. This academic requirement will be fulfilled through a full Teaching Assistant appointment (20 hours per week on average) which provides coverage of a full stipend, tuition, health insurance and health service fees. In preparation for serving as a Teaching Assistant, all incoming PhD students are required to register for the "New TA Orientation" offered at the beginning of the fall semester. Registration information for this orientation will be sent to incoming PhD students prior to the fall semester.

The Biostatistics PhD Program adheres to Brown University and Brown School of Public Health (SPH) policy regarding TA workload and TA-to-student ratio. Once a student is assigned a TA appointment, the instructor and student must arrange a time to meet before the semester starts to review expectations, roles, responsibilities, etc. Students with TA responsibilities are advised to meet regularly with the primary instructor to ensure students are meeting expectations and working the agreed weekly hours (no more than 20 for TA appointments). Students should report to the instructor and the Graduate Program Director if the TA tasks exceed 20 hours and seek an adjustment of their responsibilities.

Students may elect to participate in other teaching activities during their study at Brown, for example as guest lecturers during the semester in a departmental course. However, these activities cannot be used to fulfill the teaching requirement. Except in rare circumstances, teaching experiences at other universities cannot be used to meet the teaching requirement.

Students whose native language is not English must be evaluated and certified for English proficiency before serving as a Teaching Assistant. English language assessments are done by appointment only at the Center for Language Studies. Students should contact the Center for Language Studies early to make an appointment. This office handles the confirmation of English proficiency which is required within the first year of graduate studies and/or by the end of the semester in which the student serves as a TA. If a student's command of spoken English does not meet this proficiency, the student must enroll in the recommended ESL course(s).

Special Notes Concerning RAs and TAs

PhD students who are serving in the roles of teaching assistants or research assistants need to be appointed in those roles and compensated according to the standards for that appointment (e.g., financial payment for RAship, TAship or STAship).

Brown doctoral students should not complete research or teaching activities administered through Brown as a volunteer. Assisting a Brown faculty member with their Brown-affiliated course or research are examples of activities considered to be administered through Brown.

We recognize that students often engage in research activity and training in pedagogy (e.g., TEships) independently of a department-assigned RAship or TAship, as in the case of a student on a Presidential Fellowship or another fellowship, who engages in research despite the department-assigned RAship or TAship appointment relief conferred by these fellowships.

In these cases, the student should complete this research in the context of an independent study course. Lastly, to remain in compliance with visa restrictions, during the academic semester, doctoral international students are not permitted to pursue paid opportunities beyond their 20hr/week RAship or TA/STAship.

Fellowships

Except in extraordinary cases, all PhD students, both domestic and international, are required to apply for fellowships once they pass their oral exams. Applications should be submitted within one (1) semester of passing the Oral Exam. Students may consult with their thesis advisor and committee to identify appropriate opportunities.

Examples of dissertation fellowships include, but are not limited to:
--NIH F31 pre-doctoral fellowship (US citizens and permanent residents are eligible)
--International Student Research Fellowships, Howard Hughes Medical Institute
--NSF graduate research fellowship
--Agency for Healthcare Research and Quality (AHRQ) Research Training and Career Development Opportunities
Other sources of funding can be found at the Graduate School website and the Biomed Office of Graduate and Postdoctoral Studies website. Students are encouraged to have a discussion with their thesis advisor and committee members to identify the most appropriate funding
agency and program.

Doctoral Journal Club

Journal Club meetings for the Doctoral Program in Biostatistics occur weekly throughout the academic year. ***Attendance for all PhD students is required throughout the training period.***

The **objectives** of the journal club are to critically appraise papers in their field; improve oral and written presentation skills through scholarly debate about weekly topics; increase awareness about faculty and student-initiated research in the School of Public Health and within Biostatistics, specifically; share preliminary drafts of research reports, applications, presentations, and obtain feedback from peers; and provide mutual support with regards to course work, RA/TA activities, job searches, etc.

To achieve these goals, student leaders will identify Journal Club themes through consultation with the faculty leader.

Annual PhD Research Presentations

The ability to clearly and effectively articulate research project objectives and goals and the methods used to determine research outcomes is a crucial component of a student's training. To enhance research preparedness and afford a training opportunity in research-related communication abilities, Biostatistics Doctoral students will be required to participate in annual research presentations. This academic requirement is made as part of the student's PhD training and will not be used as an evaluation of the student's progress. The outline of this academic requirement is as follows:

4. Mandatory annual participation for all PhD students who have received a pass or conditional pass on the written Qualifying Exam.
5. Doctoral students who have not yet taken the Qualifying Exam will be invited to present as well.
6. Research presentations will take place annually, near the end of the spring semester.
7. Student presentations will be 15-20 minutes in length. Participating students will submit a title and abstract one week in advance of the presentation.
8. Attendance will be required of all Biostatistics PhD students and will be open to the public.

Student Progress and Academic Standing Evaluations

Students' academic standing is evaluated at the end of each semester to provide consolidated feedback to students about their performance and progress in the program. Student evaluations are completed with input from all Department faculty. The evaluation covers three broad areas: research, coursework, and teaching (if appropriate). The faculty will assess if a student is making appropriate progress towards their completion, if they are meeting various milestones along the PhD training (including coursework, qualifying exams, and forming a dissertation committee) and making steady progress in their dissertation research. Since TA or RA assignments form part of a student's professional training, performance in these areas may also affect academic standing.

Individual student academic standings should be discussed with advisors when received at the end of each semester. Academic progress should be a part of ongoing advising discussions as outlined, above, in the Advising section of this Handbook. The results of the evaluation are communicated to students in a formal letter from the Graduate Program Director following each progress meeting of the Department faculty, or at any point that the student's progress falls below "good" standing.

3. MASTER'S PROGRAM IN BIOSTATISTICS

Demand for advanced expertise in biostatistics continues to be high in both the public and private sectors, particularly in settings emphasizing research in public health, clinical medicine, the biological sciences, biomedicine and biotechnology. Brown's Master's degree in Biostatistics educates students to become statisticians trained to work in modern data science environments with expertise in theory and methods of statistical inference and modeling, knowledge and experience with tools of data science, and a well-developed skill set in computer programming, strong communication skills and experience working collaboratively.

Both the Master of Science (ScM) and Master of Arts (AM) degrees in biostatistics share a common set of competencies:

1. Use probabilistic and statistical concepts and methods to describe and draw inferences from biomedical data.
2. Apply appropriate statistical methods to analyze data of different types and structures.
3. Prepare report of methods, results, and interpretations from a simulation that investigates the properties of a statistical method.
4. Perform power analysis and sample size calculations to determine the required number of subjects to carry out scientific studies.
5. Use statistical software for data management, implementation of comprehensive statistical analysis, and presentation of results.
6. Write report of comprehensive and novel statistical analysis of public health data.

The primary difference between the two programs is the requirement of two additional courses plus a thesis or written project for the ScM degree as well as the restriction of the AM degree to students already enrolled at Brown.

3.1 Master of Science (ScM) in Biostatistics

The Master of Science degree program requires both coursework and a Master's thesis or project.

Course requirements for the ScM Degree Program

Entering students are assumed to have the necessary background including three semesters of calculus, one semester of linear algebra and at least one semester of mathematical probability using calculus prior to attending Brown. Students who have not taken the probability course will be strongly urged to take this in the summer before matriculation.

The Master of Science degree in Biostatistics requires 10 courses (7 required and 3 elective) in biostatistics, in addition to the mandatory PHP 1001 Public Health, a multi-module, online introduction to public health course required by all School of Public Health students. The Program's biostatistics sequence is configured as 3-3-2-2 and must be followed for this degree program. The specifics are as follows:

A. Required Courses (7 biostatistics plus PHP 1001):

PHP 2515 Fundamentals of Probability & Statistical Inference **OR** PHP 2520 Inference
PHP 2514 Applied Generalized Linear Models
PHP 2516 Applied Longitudinal Models (½ Course)
PHP 2517 Applied Multilevel Models (½ Course)

PHP 2550 Practical Data Analysis
PHP 2560 Statistical Programming with R
PHP 2610 Causal Inference & Missing Data
PHP 2650 Statistical Learning/Big Data
PHP 1001 Scope of Public Health (online course)

B. Elective Courses
(choose 3) Statistical Electives:

PHP 2030 Clinical Trials Methodology
PHP 2530 Bayesian Statistical Methods
PHP 2580 Statistical Inference II
PHP 2601 Linear Models
PHP 2602 Analysis of Lifetime Data
PHP 2605 Generalized Linear Models
PHP 2620 Statistical Methods for Bioinformatics
PHP 2980 Graduate Independent Study & Thesis Research
PHP 2590 Design of Experiments
PHP 2670 Simulation Models for Public Health Decision Making

Epidemiology Electives:

PHP 2120 Introduction to Methods in Epidemiologic Research
PHP 2150 Foundation in Epidemiologic Research Methods
PHP 2200 Intermediate Epidemiologic Methods

Programming and Data Science Electives:

PHP 2561 Methods in Informatics and Data Science for Health
CSCI 1420 Machine Learning
CSCI 1470 Deep Learning
CSCI 1570 Design and Analysis of Algorithms
CSCI 1810 Computational and Molecular Biology
CSCI 1820 Algorithmic Foundations in Computational Biology

C. Thesis/Project

The requirements for the ScM program include the coursework listed above PLUS a Master's thesis or project. Students may choose to do their thesis for credit using PHP 2980 as one of their electives or may choose to do the thesis without credit while using their 3 electives for coursework. It is also possible to use PHP2980 as an independent study unrelated to the thesis.

All students in the program will be required to write a project/thesis on a topic in one of the following areas: development of a new analytic method, detailed study of an existing method or comparison of performance of different methods (e.g. simulation studies); development of new software packages for statistical programming including a published repository, documentation and vignettes; or review or synthesis of a new or emerging statistical methodology or application.

All projects and thesis will require a significant amount of work and a written document. A thesis must follow the Brown Graduate School Guidelines and be published in this manner. Projects allow for students to engage in work that is just as rigorous but is not sufficient for submission for publication. For example, many students might be involved in preliminary analysis of clinical trials or other data which they are not allowed to publish at the time of the graduate school deadline. Or, the work may be a detailed analysis of data that forms part of a larger, publishable work.

Students should choose a thesis/project advisor from the Biostatistics faculty by the end of their first year. This advisor may also serve as the student's academic advisor if both agree. In addition to a faculty advisor, the thesis/project requires one reader who will also sign off on the finished product. The reader does not need to be a Biostatistics faculty member, but could be an outside Brown faculty member, faculty from another institution or a scientist with whom the student is working on the project/thesis. For example, the student might develop a project out of work being done through an internship at a hospital and might have the clinical supervisor serve as the reader. If the student wishes to switch from a thesis to a project, it must be done so before March 15 of the final semester. They must notify the department administrator as well as the Graduate Program Director, with the agreement of their thesis supervisor.

Details about the Master's thesis/project can be found in Appendix C1.

3.2 Master of Arts (AM) in Biostatistics

The Master of Arts in Biostatistics is designed in accordance with the Brown Graduate School specification of two special Master's Degree programs (Fifth-Year Master's degree for Brown Undergraduate students and Open Graduate Education Program for Brown doctoral students) and is open only to students already at Brown. It is ***required*** that 5th-Year Master's students take two courses counting toward the Master's degree (see below for course list) prior to matriculating into the Master's program. These ***cannot*** be courses already used towards fulfilling concentration requirements.

The AM in Biostatistics requires eight courses plus the PHP 1001 Public Health online course. Four courses are required, while the other four may be drawn from electives in Statistics, Epidemiology, and Programming and Data Science. See below for lists of some pre-approved electives.

Course Requirements for AM Degree Program

A. Required Courses (4 biostatistics plus PHP 0101):

PHP 2515 Fundamentals of Probability & Statistical Inference **OR** PHP 2520 Inference I
PHP 2514 Applied Generalized Linear Models
PHP 2550 Practical Data Analysis
PHP 2560 Statistical Programming with R
PHP 1001 Scope of Public Health (online course)

B. Elective Courses (choose 4) Statistical Electives:

PHP 2030 Clinical Trials Methodology
PHP 2516 Applied Longitudinal Models (½ Course)
PHP 2517 Applied Multilevel Models (½ Course)
PHP 2530 Bayesian Statistical Methods
PHP 2580 Statistical Inference II
PHP 2601 Linear Models
PHP 2602 Analysis of Lifetime Data
PHP 2605 Generalized Linear Models
PHP 2610 Causal Inference & Missing Data
PHP 2620 Statistical Methods for Bioinformatics
PHP 2650 Statistical Learning/Big Data
PHP 2980 Graduate Independent Study & Thesis Research
PHP 2590 Design of Experiments
PHP 2670 Simulation Models for Public Health Decision Making

Epidemiology Electives:

PHP 2120 Introduction to Methods in Epidemiologic Research
PHP 2150 Foundation in Epidemiologic Research
PHP 2200 Intermediate Epidemiologic Research

Programming and Data Science Electives:

PHP 2561 Methods in Informatics and Data Science for Health
CSCI 1420 Machine Learning
CSCI 1470 Deep Learning
CSCI 1570 Design and Analysis of Algorithms
CSCI 1810 Computational and Molecular Biology
CSCI 1820 Algorithmic Foundations in Computational Biology

3.3 Other Requirements for Master's Students

Advising

At the time of admission to the program, each student is assigned a faculty academic advisor. During the first year of study, the academic advisor assists the student in planning for meeting degree requirements and objectives and in the process of course selection. The academic advisor is expected to be familiar with the student's academic background, particularly with respect to previous graduate coursework. The assignment of an academic advisor is made by the Graduate Program Director.

The program encourages and expects that students and advisors will meet periodically during the academic year to discuss the student's progress. These meetings will take place in small group settings, with the assigned advisor, or one-on-one, as needed and requested. Advising should occur in the context of course selection and subsequently to review the results of the semi-annual evaluations conducted through the academic standing process. These semi-annual meetings are not intended to substitute for regular contact and students are encouraged to take the initiative to schedule appointments with advisors on a recurring basis.

Students' advisors will discuss the evaluation in greater detail with students and will be able to provide additional information. Topics relevant for the evaluation can include

(though are not limited to) status in academic courses, performance on the qualifying exams, progress towards the thesis or project, performance as a teaching assistant and research assistant, priorities for the coming year to facilitate progress towards completing the degree and becoming an independent investigator and current and possible financial support.

The advising relationship is an important one and students should be comfortable with their advisor. It is understood that in some cases an individual student may wish to change academic advisors. This can be done at any time by petitioning the Graduate Program Director. It is expected that if any problems or conflicts arise, students will discuss these first with their academic advisor, but may also contact the Graduate Program Director.

Students in the ScM program frequently choose to change their academic advisor to their project/thesis advisor for year 2, although this is not required. Students in the Fifth-Year program typically spend only one year in the program and have just one academic advisor. Students in the Open Graduate Education program may choose to work with a faculty member who is on their external dissertation committee or may work with an advisor chosen by the Graduate Program Director.

Student Academic Standing Evaluations

Students' academic standing (good, satisfactory, or warning) is evaluated two times per year, at the end of the fall semester and at the end of the spring semester, in order to provide consolidated feedback to students about their performance and progress in the program.

Student evaluations are completed with input from all Department faculty. Individual student academic standings should be discussed with advisors when received at the end of each semester. Academic progress should be a part of ongoing advising discussions as outlined, above, in the Advising section of this Handbook. The results of the evaluation are communicated to students in a formal letter from the Graduate Program Director following each progress meeting of the Department faculty,, or at any point that the student's progress falls below "good" standing.

Study Plans

Study Plans (Appendix D) are required for all Master's students. At the beginning of each semester, students should meet and discuss, with their advisor, the semester's course work and select courses best suited for the student's long-term goals. It is required that these study plans are clearly defined, approved by the student's advisor and submitted to the Department's Program Coordinator

Transfer Credits

Master's degree students are allowed to transfer in credit for one course of graduate work done while in graduate residence at another institution. To receive transfer credit, students must complete the appropriate application, available from the University Registrar or the Graduate School.

MinimumGradeRequirementforallMaster'sStudents

The Department's Master's Graduate Program follows the Brown University policy indicating that a minimum grade of C in all courses carries credit toward all advanced degrees.

Any credits transferred from other institutions will not be counted in the grade average. Master's students must maintain a B average grade to qualify and receive the merit-based scholarship determined by the SPH upon enrollment.

Journal Club and Career Seminar Series

The Journal Club and Career Seminar Series meets weekly throughout the academic year.
First year students are required to attend all meetings.
Second year students are required to attend all research and journal article presentations as well as alumni/employer job talks.

The objectives of the Career Seminar Series are to gain critical skills towards future employment in Biostatistics or similar fields. This includes but is not limited to networking, resume building, interviewing, etc. The objectives of the journal club are to critically appraise scientific papers; improve oral and written presentation skills through scholarly debate about topics; increase awareness about faculty and student-initiated research in the School of Public Health and within Biostatistics, specifically; share preliminary drafts of research reports, applications, presentations; and obtain feedback from peers; and introduce students to professional life as a biostatistician through talks from alumni, outside experts and employers.

This series also provides a forum to inform students about academic life at Brown and especially in Biostatistics. This includes discussions about choosing a mentor, developing a thesis or project proposal and use of university resources (Brown Library, Center for Digital Scholarship, Writing Center, CareerLAB).

Master's Research Assistantships and Research Opportunities

Masters students may participate in Research Assistantships in a variety of on and off campus settings, including the Center for Statistical Sciences, the Center for AIDS Research, the Center for Evidence Synthesis in Health and other Public Health research centers in addition to clinical departments at Brown-affiliated hospitals. Assistantships, when available, can be composed of a full-time appointment (20 hours/week), a part-time (10 hours/week), or a limited-duration appointment (limited in time, effort, and/or scope). Details concerning remuneration can be discussed with the Master's Graduate Program Director or Department administrative staff.

Students appointed to a Master's RA will work the required hours as defined by the appointment type and will be arranged between the student and the sponsor, taking into account class schedules and the needs of the sponsor. To maintain eligibility, students must maintain a full-time student status and be in good academic standing. Students are not expected to work during any of the official Brown holidays. It is recommended that students with a full-time RA appointment be allowed to take 4 weeks paid vacation during the calendar year; 2 weeks during winter break and 2 weeks in the summer months. RA appointments under 20 hours per week will have prorated vacation time, based on effort. It is strongly recommended that students coordinate time off with the sponsor with whom they work.

Students may also do research under an hourly wage contract if the sponsoring unit cannot do a formal Research Assistantship. It is best to set these up through the Department to ensure an equitable financial and working environment. Appointments of international students must be made through Brown to be in compliance with visa guidelines.

BROWN
Public Health

Doctoral Programs in
Biostatistics, Epidemiology and
Health Services Research

Dissertation Committee Confirmation Form

(Consult Student Handbook for Details/Requirements)

Student Name: _____ Date: _____

Department: _____

Propose Topic and Committee Members (three required; additional space provided):

Dissertation Title: _____

	Type or Print Name	Signature
Dissertation Advisor:	_____	_____
Oral Exam Chair (if different from Advisor):	_____	_____
Committee Member:	_____	_____
Committee Member:	_____	_____
Committee Member: ☐ (Check if member is External Reader)	_____	_____

Obtain Graduate Program Director's Signature:

_____ _____

Graduate Program Director Signature | Date

Distribution: Provide copies to the Program Director and Administrative Coordinator

BROWN
Public Health

Doctoral Programs in
Biostatistics, Epidemiology and
Health Services Research

Oral Exam Date Request Form

(Consult Student Handbook for Details/Requirements)

Student Name: _____ Date: _____

Department: _____

Dissertation Title: _____

Committee Members (Type or Print Names**):**

Dissertation Advisor: _____
Oral Exam Chair:
(if different from Advisor) _____

Committee Member: _____

Committee Member: _____
Committee Member:
□ (Check if External Reader) _____

Schedule Oral Exam and Submit Dissertation Proposal
(2-3 weeks prior to Oral Exam; end of semester 5 or within one year of written exam)

Proposed Oral Exam Date: _____ Oral Exam Location: _____
(Contact Administrative Coordinator)

Proposal has been provided to committee members? ☐

Obtain Graduate Program Director's Signature:

_____ _____
Graduate Program Director Signature Date

Distribution: Provide copies to the Program Director and Administrative Coordinator

BROWN
Graduate School *Forms*

Brown University
Box 1867
Providence, RI 02912
tel: 401 863-2600
fax: 401 863-7341
Graduate_School@brown.edu

DISSERTATION DEFENSE INFORMATION

STUDENT NAME: _____ **SIS ID NUMBER:** _____

DEPARTMENT: _____

PREVIOUS DEGREES

DEGREE _____ INSTITUTION _____ DATE AWARDED _____
DEGREE _____ INSTITUTION _____ DATE AWARDED _____
DEGREE _____ INSTITUTION _____ DATE AWARDED _____

DEFENSE DETAILS DATE _____ TIME _____
BUILDING _____ ROOM _____

EXACT TITLE OF DISSERTATION

COMMITTEE

DIRECTOR _____ DEPARTMENT _____
READER _____ DEPARTMENT _____
READER _____ DEPARTMENT _____
READER _____ DEPARTMENT _____

PRELIMINARY EXAMINATION

DATE PASSED _____

LANGUAGE REQUIREMENTS

_____ DATE PASSED _____
_____ DATE PASSED _____
_____ DATE PASSED _____

DEPARTMENTAL TEACHING REQUIREMENT

☐ SATISFIED ☐ NOT REQUIRED

SUPERVISED RESEARCH REQUIREMENT

☐ SATISFIED ☐ NOT REQUIRED

_____ _____
Director of Graduate Study Date

BROWN
Public Health

Doctoral Program in Biostatistics

Oral Exam Results

Instructions: The student completes through the committee members and then gives the form to the Oral Exam Chair who will provide the results, sign and give copies to the Graduate Program Director, Administrative Coordinator and student.

Student Name: _____ Date of Oral Exam: _____

Department: _____

Dissertation Title: _____

Committee Members (Type or Print Names**):**

_____ _____
Dissertation Advisor Committee Member

_____ _____
Committee Member Committee Member

Outcome:
□ Student Passed (Date Passed: _____)
□ Student Conditionally Passed □ Student Did Not Pass

Overview of What Happened during the Oral Exam:
(If student conditionally passed, what must the student do in order to pass?)

Oral Exam Chair's Signature:

_____ _____ _____
Print Name Signature Date

Distribution: Provide copies to the student, Program Director and Administrative Coordinator

Program Progression Checklist – Biostatistics PhD

Student Name: _____

Advisor: _____

Semester Enrolled: _____

REQUIRED COURSES:

Course #	Course Name	Semester Completed and Grade	Comments (If using transferred credit, list course number of name and attach approval form)
PHP2520	Statistical Inference I		
PHP2530	Bayesian Statistical Methods		
PHP2550	Practical Data Analysis		
PHP2580	Statistical Inference II		
PHP2601	Linear Models		
PHP2605	Generalized Linear Models		
PHP2602	Analysis of Lifetime Data		
PHP2610	Causal Inference and Missing Data		
PHP2950	PhD Journal Club		
PHP1001	Public Health Overview (No Credit – Online Course)		
PHP2120	Introduction to Methods in Epidemiologic Research		

ELECTIVES:

(Must take at least 5 electives – including at least 2 from Biostatistics and 1 in a substantive field of application)

Course #	Course Name	Semester Completed and Grade	Comments (If using transferred credit, list course number of name and attach approval form)
PHP2030	Clinical Trials Methodology		
PHP2603	Analysis of Longitudinal Data		
PHP2604	Statistical Methods for Spatial Data		
PHP2620	Statistical Methods for Bioinformatics		
PHP2650	Statistical Learning and Big Data		
PHP2690	Avanced Topics in Biostatistics		
APMA2610	Recent Applications of Probability/Statistics		
APMA2921	Stochastic Processes on Graphs		
APMA2811	Convex Analysis + Minimization Algorithm		

	Qualifying courses in other departments (APMA, ECON, CS) with approval from Graduate Director		

ADDITIONAL PROGRAM REQUIREMENTS:

Requirement	Semester Completed	Comments
TA Requirement		
Teaching Certification Program (optional)		
Written Qualifying Exam		
Part I: Theory and Methods		
Part II: Application		
Oral Exam (6-9 months after written)		
Thesis Topic (end of semester 4)		
Dissertation Proposal Copy (2-3 weeks prior to defense)		
Dissertation Committee Form		
Defense Date Set (end of Semester 8)		
Defense Flyer (3-4 weeks prior to defense)		
Dissertation Defended		
Dissertation to Graduate School		
Degree Conferred		

Updated: August 2023

Guidelines For the Development and Submission of The ScM in Biostatistics Thesis/Project

ScM Program in Biostatistics
Brown University School of Public Health
http://publichealth.brown.edu/biostatistics/

TABLE OF CONTENTS

INTRODUCTION

All ScM students in Biostatistics are required to complete a thesis/project. The thesis/project is an ongoing process during the student's academic program. Students will be guided into the development process as a part of their small group advising sessions, but a considerable amount of time outside of these meetings is expected.

Students are encouraged to meet with the Masters Program Director, their small group advisor, and other faculty in the department in order to learn about research opportunities or to develop a strategy.

In addition, students may find it helpful to explore the theses/projects completed by previous ScM students.

THESIS vs PROJECTS

There are differences between the thesis and projects which must be discussed prior to a student making a selection. A thesis as outlined in: http://www.brown.edu/academics/gradschool/masters-thesis-guidelines, is a publishable quality research paper. It is expected to contain new information that has not been published prior to this work and add to the greater biostatistics/public health community. A project is still a substantial research project but does not require publication. It is still expected to contain high quality public health relevant work but not necessarily publishable.

Possible Thesis topics include:

- Creation of New Statistical Tools.
- Theoretical Comparison of Statistical Tools.
- Simulation Based Comparison of Tools.
- Extension of current method for use in a unique area.
- Comprehensive statistical programming package of new methods with accompanying paper and tutorial vignettes.
- Etc…

Possible Project topics include:

- In depth Data Analysis.
- Basic Statistical programming package.
- Creation of Educational Materials.
- Data Visualizations.
- Etc…

For further guidance, consult your thesis/project advisor as well as the Masters Program Director.

PROPOSING THE THESIS

Students must submit a proposal for the Thesis/Project before the end of their first year. The proposal should clearly define and justify the thesis/project, including a timeline for the various components and a statement of the proposed final product and its contribution to the student's educational and career goals. Students must complete the attached proposal form *(Appendix A)* and submit it to Masters Program Director by May 15 for approval. Students will receive an e-mail confirming approval of the thesis/ project.

The thesis proposal must be approved by the thesis advisor, as well as Masters Program Director.

Students must choose a thesis/project advisor to provide guidance throughout the development of the thesis. The thesis advisor should be a faculty member in the Biostatistics Department. Students also choose one thesis reader to provide additional feedback. The thesis reader may be an expert from outside the Department of Biostatistics, as long as they serve a fundamental purpose to the development of the thesis.

Students are required to choose their thesis/project advisor by the completion of their first year. It is suggested that thesis/project reader is chosen at this time as well but students may wait until the start of the Fall Semester of their second year, September 1, for the final reader selection. Once the thesis/ project and the thesis advisor and reader are approved by Masters Program Director, it is the responsibility of the thesis/project advisor to determine when the thesis project has been satisfactorily completed.

All thesis/project proposals MUST be approved by the thesis/project advisor, the thesis/project reader and the Masters Program Director as early as possible and before substantive work on the thesis has been undertaken. All students must have an approved thesis/project by May 25th of the first year. (The forms are due to the Masters Program Director by May 15 as stated above, however any changes or corrections must be made by May 25th.

THESIS/PROJECT DEVELOPMENT

The ScM Thesis/Project should be a substantive and important project in public health. Students are encouraged to view the thesis as an opportunity to apply the skills and knowledge that they have gained in their training to real world public health

The selection of a thesis/project topic should be informed by the student's individual interests and educational goals. There are many opportunities to translate individual interests and educational goals into an acceptable thesis/project. As a result, it is critical to seek advice from faculty and advisors early in the Master's career. The development of the thesis/project should reflect the guidance of the student's advisors. Although many types of public health projects may serve as an Masters thesis/project, selection of a thesis topic should be guided by the suggestions laid out in the Thesis vs Project Section.

All thesis/project proposals MUST be approved by the thesis/project advisor, the thesis/project reader and the Masters Program Director, before substantive work on the thesis has been undertaken. All students must have an approved thesis by May 25th of the first year.

DATA

For students planning to work with data, they may use existing public datasets or petition for one from a researcher. Students should consult with their thesis advisor to choose the most appropriate dataset and sample size to conduct their investigation.

Students may choose to use national datasets, such as the Behavioral Risk Factor Surveillance System (BRFSS) or any one of the many datasets available from the National Center for Health Statistics (NCHS). The Department of Health and other state agencies have public use datasets and other sources of data are available from federal public health agencies. *Please see Appendix C for data resources.*

In addition, Brown University faculty conducting research in the Centers, Programs and Institutes of the Public Health Program, have a large array of research projects using public health relevant databases. Students may consider the following research centers in accessing data for their theses:

- **Center for Statistical Sciences**
- **Center for Evidence Synthesis in Health**
- **Brown University AIDS Program (BRUNAP)**
- **Center for Alcohol and Addiction Studies**
- **Centers for Behavioral and Preventive Medicine**
- **Center for Environmental Health and Technology (CEHT)**
- **Center for Gerontology and Health Care Research**
- **Hassenfeld Child Health Innovation Institute**
- **Center for Population Health and Clinical Epidemiology**
- **Center for Primary Care and Prevention**
- **International Health Institute**
- **Institute for Community Health Promotion**
- **Population Studies and Training Center**

TIMELINE FOR THE THESIS PROJECT

The thesis constitutes significant effort requiring several semesters. Students should consult with their academic advisor and their thesis/project advisor to create an appropriate timeline for the thesis/project. Students are advised to meet with their thesis/project advisor and reader on a regular basis. It is important to plan a meeting schedule with the thesis/project advisor throughout the development of the thesis/project. Please review the *Timeline for the ScM in Biostatstics Thesis/Project* on the next page.

Students must choose their thesis advisor and reader and submit the thesis proposal by **May 15th** of their first year (*Appendix A*). Students whose thesis projects require review and approval by the Brown Institutional Review Board (IRB) will require several additional months of preparation before they can begin data collection. By May 15th, the thesis project should be well conceptualized and designed and have received approval from the thesis advisor, reader, and the Masters Program Director. Once the thesis/project and the thesis/project advisor and reader are approved by the Masters Program Director, it is the responsibility of the thesis/project advisor and thesis/project reader to determine when the thesis project has been satisfactorily completed.

Students must submit a 5-7 literature review as well as detailed thesis/project timeline to their thesis/project advisor and reader.

It is expected that students will spend the summer working on your thesis and completing any additional requirements stipulated on their thesis proposal form. The revised thesis proposal, including a summary of the work that students conduct during the summer, is due to the thesis committee on August 15. The final thesis/project proposal is due to the Department no later than September 1, 2023.

A signature of these accomplishments as well as the timeline is due to the Masters Program Director by September 1. It is suggested that the student complete these by August 15 so that the thesis/project advisor and reader have adequate time to fully review the material. Failure to procure a signature by that date could result in the student being unable to complete the ScM degree program in the allotted two years.

Students must submit a progress report completed by their thesis/Project advisor by **November 15 and January 15**. The advisor should indicate whether or not the student has made adequate progress toward completion of the thesis/project and if they will be able to complete the thesis in a timely manner prior to graduation.

In the final year of study, students in the ScM Program in Biostatistics must complete a rough draft of the thesis/project by **March 1st** for graduation that year. A complete document of the thesis/project should be completed by **April 1st** for review and final comments from thesis advisor and reader. The final draft of the thesis is due to the graduate school by **May 1st**. The final draft of the project is due to the Biostatistics Department by **May 1st.**

Students are advised to allow sufficient time to make corrections and prepare the thesis for submission to the Graduate School. This should include developing a timeline with the thesis advisor and reader to be sure that they have sufficient time to read the thesis, return comments (multiple times) and sign it prior to the deadline.

First Year	* for students planning to graduate in two years
First Semester	**Meet with Faculty** Students should confer with their small group advisor and review the faculty directory to find faculty with public health research interests similar to their own. Students should meet with faculty to discuss their research projects and current issues in the student's area of interest. (https://www.brown.edu/academics/public-health/biostatistics/about/contact/faculty) **Preliminary Researchs** Students should begin to narrow their thesis topic by reading the literature and meeting with potential thesis/project advisors. Discussions with the small group advisors should provide the opportunity to explore various aspects biostatistics topics. Students might also want to learn about the thesis projects previous ScM students have completed, which are located in the Department of Biostatistics Library.
Second Semester	**Decide on Advisor** It is really important to start your advisor and thesis/project search early. Faculty work with Undergraduate, Masters and PhD students. Some faculty have very limited availability to do thesis/project advising. **START EARLY!** **May 15th – Thesis Proposal Due** Students should identify a thesis/project advisor and thesis/project reader to guide the development of their thesis/project proposal. The thesis/project a brief description of the thesis/project, sources for any data and explanation of data, list of basic reference material for the start of the literature review and a basic timeline. The proposal should clearly define and justify the thesis/project. The proposal must be approved by the thesis/project advisor and reader, as well as the Masters Program by May 25th (*Appendix A).*
Second Year	
Summer	**Students must begin thesis preparation work during the summer.** **Data Collection** Students who are needing access to data should begin this process early and work on obtaining data over the summer. **Draft of Literature Review** Students need to complete a 5-7 page literature review on the methods and work that they plan on doing for the thesis. Faculty are not always readily available during the summer, so planning ahead is important. **Updated Thesis/Project Proposal** Once data has been obtained and students have worked on a literature review, they aims of the thesis/project will become more developed and perhaps have changed slightly from the initial proposal. By **September 1**, students will be expected to submit their approved literature review as well as updated thesis proposal and timeline for the thesis/project. This needs to have an approval signature from the advisor and reader prior to submission, so it is advised that students have these to their advisor in a draft form by **August 15.**
First Semester	**Data Cleaning and Analysis** All data cleaning analyses should be completed by the end of the first semester, to allow time for writing and interpretation. **First Draft of Beginning Sections** Students need to submit a progress report by **November 15,** this means the writing needs to be started at this time. Failure to have any writing done by this point may result in the student being placed on the AM track instead. **November 15th – Progress Report** Students must submit a progress report completed by their project/thesis advisor by **November 15th**. The advisor should indicate if the student has met the recommended timelines; has made good progress toward completion of the thesis; and will, or will not, be able to complete the thesis/project by May 1st (*Appendix B*).

Second Semeste	**January 15th – Progress Report**
	Students must submit a progress report completed by their\project thesis advisor by **November 15th**. The advisor should indicate if the student has met the recommended timelines; has made good progress toward completion of the thesis; and will, or will not, be able to complete the thesis\project by April 1st (*Appendix B*). **March 1st- Submit Thesis Rough Draft to Thesis Advisor and Reader** **April 1st- Submit Thesis/Project** Students must complete the thesis by **April 1st** to allow sufficient time to respond to formatting changes to comply with the requirements of the Graduate School. Students need to allow enough time for the thesis advisor and reader to review the thesis, return comments (to be addressed by student in final draft), and sign the thesis prior to the March 1st deadline. **May 1st- Submit Thesis to Graduate School and Project to Department** The Master's Thesis must be submitted to the Graduate School for graduation in May.

FORMAT OF THE THESIS

The ScM in Biostatistics thesis/project is expected to be the work of a professional; therefore it should be professional in all aspects. The thesis should be written for a specific audience that includes one or more of the following: researchers, policymakers, program directors, health care and other service providers, biostatisticians, intervention developers, and/or program evaluators. It should be methodologically rigorous and use appropriate methods.

There are no page length requirements for the ScM thesis/project. The document should be well organized and the sections should flow logically. The thesis/project should result from a discussion between the student and his/her advisors. A suggested format of the written document is suggested below:

- **Abstract** The abstract should summarize the project and major findings in a concise paragraph.
- **Background** The background should cover the major relevant literature (or all of the literature if there are few relevant publications) in a clear, concise manner.
- **Statement of purpose** The statement of purpose should be a clear and concise statement of the primary objective(s) of the work.
- **Methods** The methods section should explain, in a clear and organized fashion, how the project was conducted. The population under study should be clearly delineated, including the sampling frame, if appropriate, and sample sizes. The statistical methods and software used for analysis should be stated.
- **Results** The results section should contain tables, charts and figures, as appropriate, to display study results. The major findings should be reported in the text, referring the reader to the appropriate tables, charts, and figures. Results should be reported clearly and logically, without discussion. If not an empirical work, the results should present the qualitative or literature based information on which the paper's argument is based.
- **Discussion** including limitations. The discussion section should be a well-organized discussion of the major findings and should include comparison with previous studies and possible explanations for findings. The major limitations of the study and their possible effects on the study results should be presented.
- **Conclusions/Recommendations** The conclusions/recommendations section should state the implications of the major findings and may include public health policy or suggestions as to how the finding informs a relevant public health policy issue.
- **References**
- **Appendices** including study tools.

Students are advised to study the style of research articles from major peer-review journals, such as the *American Journal of Public Health*, *American Journal of Epidemiology*, and *the New England Journal of Medicine* to review examples of methods, results, and discussion sections and to obtain ideas for the formatting of data tables.

SUBMISSION

Students are required to submit electronic copies of the thesis to the Graduate School, the thesis advisor, the thesis reader, and the Masters Program Director. Students are also required to submit an electronic copy of their thesis to the Biostatistics Masters program. Students completing a project must submit a copy of their project to the Biostatistics Masters Program.

Students should follow the preparation, formatting and submission guidelines of Master's Theses from the Graduate School. These guidelines are on the website at http://www.brown.edu/academics/gradschool/masters-thesis-guidelines.

For more information regarding the submission of your thesis, please contact the Graduate School at (401)863-2843 .

STUDENT RESOURCES

Where To Go For Help

The thesis advisor and reader should serve as the primary sources of assistance and guidance throughout the development of the thesis. Since the thesis process requires a variety of skills, including writing, communication, and data analysis, students may find the following resources compiled from thesis advisors helpful. Deborah Pearlman, PhD, who has served as a thesis advisor to numerous MPH students, suggests the following resources to review.

ENVISIONING THE THESIS

1. Designing Clinical Research: An Epidemiologic Approach, by Stephen B. Hulley, Steven R. Cummings, Warren S. Browner, Deborah Grady, Norman Hearst, and Thomas B. Newman. Second Edition. Lippincott Williams & Wilkins. 2001.
2. Developing effective research proposals, by Keith F. Punch. London: Sage, 2000. Particularly helpful to students writing professional reports.
3. Proposal writing: the art of friendly and winning persuasion, by William S. Pfeiffer, Charles H. Keller, Jr. Upper Saddle River, NJ: Prentice Hall, 2000.
4. Proposals that work: a guide for planning dissertations and grant proposals, by Lawrence F. Locke, Waneen Wyrick Spirduso, Stephen J. Silverman. 4th ed. Thousand Oaks, CA: Sage, 2000.
5. Studying a Study and Testing a Test: How to Read the Medical Evidence, by Richard K. Riegelman. Fourth Edition. Lippincott Williams & Wilkins. 2000.

INSTITUTIONAL REVIEW BOARD (IRB) PROCEDURES

Research Protections Office
http://www.brown.edu/research/office-vice-president-research/offices/research-protections-office/research-protections-office

RPO provides weekly office hours, during which researchers may stop in to receive clarification of IRB policies and guidance in preparing human research protocols for presentation to the IRB.

What: Institutional Review Board OPEN HOURS
When: TUESDAY 12 – 1 PM
FRIDAY 2 – 3 PM
Where: Research Protections Office, Brown University
2 Stimson Avenue
Box 1986, Providence, RI 02912
Phone: (401) 863-3050
Who: Anyone (students, faculty, staff) needing assistance with human research related issues or any IRB-related policy or procedure.

For more information, please contact Lynn Menatian, IRB Coordinator at (401) 863-3050;

RPO also conducts departmental workshops, which are carefully tailored to the specific research needs of the department. Faculty, students and staff can request one-on-one meetings to discusss human research projects, or an RPO representative can provide small group seminars regarding human research protections and IRB processes. These seminars are also customized to the research needs of the group or department. A coordinated, responsive, and in-depth education and outreach program encompassing all elements of the inclusion of people as research participants is essential to a strong human research protections program.

WRITING

Assistance with writing is available to students through the Brown University Writing Center. Writing Center Associates are prepared to discuss all stages of the writing process, from finding a topic through revision and editing strategies. Associates can help writers deal with writer's block, audience awareness, argumentation, organization, grammar, research skills, the conventions of academic writing, English as a Foreign Language, and issues of clarity and style. For more information, visit the Harriet W. Sheridan Center.

1. Using sources effectively: Strengthening your writing and avoiding plagiarism, by Robert A. Harris.. 2nd ed. Los Angeles: Pyrczak Pub., 2005.
2. Ethnographic writing research: writing it down, writing it up, and reading it, by Wendy Bishop. Portsmouth, NH: Heinemann, 1999.
3. Guide to the successful thesis and dissertation: a handbook for students and faculty, by James E. Mauch and Jack W. Birch. 5th ed. NY: M. Dekker, 2003.
4. How to write & publish a scientific paper, by Robert A. Day. 5th ed. Phoenix, AZ: Oryx Pr., 1998.
5. Writing empirical research reports: a basic guide for students of the social and behavioral sciences, by Fred Pyrczak and Randall R. Bruce. 3rd ed. Los Angeles: Pyrczak Pub., 2000.

STYLE MANUALS

1. American Medical Association Manual of Style: A Guide for Authors and Editors. Ninth Edition. Williams & Wilkins. 1998.
2. The Chicago manual of style. 15th ed. Chicago: Univ. of Chicago Pr., 2003.
3. Electronic styles: a handbook for citing electronic information, by Xia Li and Nancy B. Crane. 2nd ed. Medford, NJ: Information Today, 1996.
4. The MLA style manual and guide to scholarly publishing. 2nd ed. NY: Modern Language Assoc. of America, 1998.

5. Style sheets for citing Internet resources: MLA, APA, Turabian *(UC Berkeley, Library)* Gives basic guidelines for formatting citations from a variety of electronic resources, adapted from the *Columbia guide to online style.* http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/Style.html
6. A Manual for Writers of Term Papers, Theses, and Dissertations, by Kate L. Turabian, Kate L. Fifth Edition. The University of Chicago Press. 1987.

PUBLISHING

1. Publishing and Presenting Clinical Research, by Warren S. Browner. Lippincott Williams & Wilkins. 1999.

APPENDIX A: PROPOSAL FOR THE ScM IN BIOSTATISTICS THESIS/PROJECT

Students must submit this proposal form, signed by the thesis advisor and reader, accompanied by a one-two page description of the thesis work, by **May 15th** of the year prior to the intended graduation year. The Thesis/Project description should include a brief background into the problem, what questions does the thesis/project hope to answer, the intended timeline for work to be completed, a list of 4-5 references that the student will begin to read for the literature review. Students should complete this proposal form, including appropriate signatures, and submit it to the Master's Program Director for approval. Students will receive an email confirmation when the thesis/project proposal has been approved.

Student Name

Thesis Title

Signature Date

Please indicate the final thesis/project product*:

Thesis

Project

Thesis/Project Advisor

Name ☐

Mailing Address

City State Zip

Email address

I have read this thesis/project proposal and the required thesis competencies; I approve this proposal and agree to serve as the thesis advisor for this project.

Signature Date

Thesis/Project Reader

Name

Mailing Address

City State Zip

Email address

I have read this thesis/project proposal and the required thesis competencies; I approve this proposal and agree to serve as the thesis reader for this project.

Signature Date

APPENDIX B: PROGRESS REPORT FOR THE ScM IN BIOSTATISTICS THESIS/PROJECT

Students must submit 2 progress reports completed by themselves and signed by their advisors by **November 15th** and **January 25th**. Students must detail what work has actually been completed by this date and what work still needs to be completed. The advisor should indicate whether or not the student has made adequate progress toward completion of the thesis/project by **April 1st**, and the dates by which the thesis/project components have been, or will be, completed (see recommended timeline in Thesis Guidelines document).

The Progress Report must be completed by the thesis advisor and submitted to the Master's Program Director by November 15 and January 25.

Student: Please attach a one page description of the work you have completed on your thesis project and the steps you will take to finish the thesis/project by April 1st; provide this information to your thesis advisor. Be sure to indicate the dates of completion for the following thesis components:

Thesis Components	**Date Completed/Expected**	**Advisor/DGS Signature (Upon Completion)**
Brief Initial Proposal **(Due May 15th)**		
Updated Proposal **(Due September 1st)**		
November Update **(Due November 15th)**		
January Update **(Due January 25th)**		
Rough Draft **(Due April 1st)**		
Final Thesis **(Due May 1st)**		

Student Name

Thesis Title

Signature Date

September 1 Updated Proposal: Thesis Advisor (*Please check all that apply.)*

☐ There have been no significant changes to the original proposal.

☐ There have been significant changes to this proposal.

☐ The student has developed a timeline and I approve.

☐ The student made satisfactory progress over the summer.

☐ The student will be completing a project instead of a thesis.

Name Email address

Thesis Advisor Signature Date

Thesis Reader Signature Date

November 15 Update: Thesis Advisor (*Please check all that apply.)*

☐ This student is on track to complete the thesis/Project by April 1st.

☐ This student is NOT on track to complete the thesis/project or meet the competencies by April 1st.

☐ I will work with this student to meet the thesis/project completion by the deadline.

☐ This student cannot complete the thesis/project in time to graduate in May.

☐ This student will be completing a project instead of a thesis.

Name Email address

Thesis Advisor Signature Date

Thesis Reader Signature Date

January 25 Update: Thesis Advisor (*Please check all that apply.)*

☐ This student is on track to complete the thesis/Project by April 1st.

☐ This student is NOT on track to complete the thesis/project or meet the competencies by April 1st.

☐ I will work with this student to meet the thesis/project completion by the deadline.

☐ This student cannot complete the thesis/project in time to graduate in May.

☐ This student will be completing a project instead of a thesis.

Name Email address

Thesis Advisor Signature Date

Thesis Reader Signature Date

Study Plan for ScM Degree in Biostatistics

Revised April 2023

Name:	
Expected Semester Of Completion:	
Year / Semester Entered:	
Approved Course Structure	***3-3-2-2 (ScM)*** *Note: Student with approved transfers are required to complete only 9 courses*
Email Address:	
Academic Advisor:	
Date Updated & approved:	

***Courses** *(refer to guide below)*	*Approved for* (Semester / Year)	*Registered on Banner (Yes or No)*	*Notes*
PHP 2515 Fundamentals of Probability & Statistical Inference OR PHP2520 Statistical Inference I	***Fall***	☐	
PHP 2514 Applied Generalized Linear Models	***Fall***	☐	
PHP 2550 Practical Data Analysis	***Fall***	☐	
PHP 2560 Statistical Computing with R	***Fall***	☐	
PHP 2610 Causal Inference & Missing Data	*Fall*	☐	
PHP 2516 Applied Longitudinal Models (1/2 Course)	*Spring*	☐	
PHP 2517 Applied Multilevel Models (1/2 Course)	*Spring*	☐	
PHP 2650 Statistical Learning/Big Data	*Spring*	☐	
Approved ELECTIVE 1		☐	
Approved ELECTIVE 2		☐	
Approved ELECTIVE 3		☐	
PHP 1001 Scope of Public Health – (multi-module online SPH course – no credit)		☐	
Other: Additional Electives or Course Transfers		☐	

Study Plan for ScM Degree in Biostatistics

Revised April 2023

Guide to Degree Requirements

The ScM degree in Biostatistics requires 10 plus the PHP 1001 Public Health online course. The specifics are as follows:

A. Required Courses (7 courses)

PHP 2515 Fund. of Probability & Statistical Inference OR PHP 2520 Statistical Inference I
PHP 2514 Applied Generalized Linear Models
PHP 2516 Applied Longitudinal Models (½ Course)
PHP 2517 Applied Multilevel Models (½ Course)
PHP 2550 Practical Data Analysis
PHP 2560 Statistical Programming with R
PHP 2610 Causal Inference & Missing Data
PHP 2650 Statistical Learning/Big Data
PHP 1001 Scope of Public Health (non-credit, online course)

B. Elective Courses (at least 3)

Statistical Electives:

PHP 2030 Clinical Trials Methodology
PHP 2530 Bayesian Statistical Methods
PHP 2590 Design of Experiments
PHP 2580 Statistical Inference II
PHP 2601 Linear Models
PHP 2602 Analysis of Lifetime Data
PHP 2605 Generalized Linear Models
PHP 2620 Statistical Methods for Bioinformatics
PHP 2670 Simulation Models for Public Health Decision Making
PHP 2980: Graduate Independent Study & Thesis Research

Epidemiology Electives:

PHP 2120 Introduction to Methods in Epidemiologic Research
PHP 2150 Foundation in Epidemiologic Research Methods
PHP 2200 Intermediate Epidemiologic Methods

Programming and Data Science Electives:

PHP 2561 Methods in Informatics and Data Science for Health
CSCI 1420 Machine Learning
CSCI 1470 Deep Learning
CSCI 1570 Design and Analysis of Algorithms
CSCI 1810 Computational and Molecular Biology
CSCI 1820 Algorithmic Foundations in Computational Biology

*Advisor signature 1st Semester (required)*_____ *Date*_____

*Advisor signature 2nd Semester (required)*_____ *Date*_____

*Advisor signature 3rd Semester (required)*_____ *Date*_____

*Advisor signature 4th Semester (required)*_____*Date*_____

Study Plan for ScM Degree in Biostatistics

Revised April 2023

PLEASE NOTE: (ONLY) Students who request elective courses not included in the above list and/or not in accordance with the approved course structure, must indicate any deviations with relevant justification(s), in the spaces provided below. Advisor and GPD sign off is required.

☐ *1. Plans to graduate (complete) early. _____(semester / year)*

☐ *2. Career enhancement _____*

☐ *3. Taking course as a pre-requisite_____*

☐ *4. (Other – give detailed reasons)_____*

Advisor signature / approval (required)_____Date_____

Graduate Program Director signature /approval_____Date_____