Student Handbook

Biostatistics

August 1, 2025

The guidelines in this document apply to students who enrolled in Fall 2025.

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Table of Contents

PURPOSE OF STUDENT HANDBOOK

The purpose of the Student Handbook is to help guide students as they progress through the graduate program. Because the program is conferred and governed by the academic requirements established by the Vanderbilt University (VU) Graduate School, students should also be familiar with the policies and procedures in the Vanderbilt University Student Handbook and Vanderbilt University Graduate School Catalog. Subsections that pertain only to MS-track or Ph.D.-track students are labeled as such. For questions about information in the handbook, students should contact their advisor, the Program Manager, or the Director of Graduate Studies.

OVERVIEW OF ACADEMIC PROGRAMS

MISSION STATEMENT

Vanderbilt's graduate program in biostatistics is devoted to training flexible thinkers versed in modern methodologies who will become leaders in academia, industry, and government.

OVERVIEW

Biostatistics is the branch of statistics responsible for proper collection, analysis, and interpretation of data generated in the biological, public health, and biomedical sciences. Biostatisticians routinely encounter data that are complex, high-dimensional, and/or large in scale. Statistical methods and their potential applications are now too numerous to list. Biostatisticians must rely on a broad framework of mathematical, statistical, and scientific principles that will lead them to learn from data properly and reliably.

Biostatisticians must be trained as apt mathematicians and cogent scientists. Our graduate program features rigorous classroom training, real-world apprenticing, exceptional computational preparation, and one-to-one mentoring in the theory, methodology, and application of biostatistics in biomedical research. Our program emphasizes modern statistical thought and features the foundations of statistical inference—a topic of critical importance when interpreting data as scientific evidence. The program aims to strike a balance between theoretical rigor, methodological proficiency, and functional aptitude. There is a strong emphasis on reproducible research and how to achieve it from a statistical perspective. The curriculum is nondenominational with respect to the foundations of statistical inference (i.e., frequentist, Bayesian, likelihood), modern in its emphasis on computing and teaching of statistical principles, and progressive with its emphasis on communication skills.

Our Doctor of Philosophy (Ph.D.) and Master of Science (M.S.) programs meet the range of biostatistical career opportunities in academia, industry, and government. Students have learning goals in five major domains: aptitude in statistical theory, proficiency in biostatistics methodology, adeptness in statistical computing, written and verbal communication, and community engagement.

DEGREE REQUIREMENTS

Official degree requirements are provided in the Vanderbilt University Graduate School Catalog (see "Biostatistics" under "Programs of Study"), which also provides detailed course descriptions (see "Biostatistics" under "Courses by Subject Areas"). This section is for information only.

REQUIREMENTS FOR THE DOCTOR OF PHILOSOPHY

Candidates for the Ph.D. must complete eight core courses and nine elective courses (and associated labs, if any). Students must earn credit for a minimum of 72 semester hours, including at least 24 formal, didactic credit hours. The core curriculum includes: a three-course theory sequence on probability, inference, and stochastic processes; a three-course methodology sequence on foundational frequentist, Bayesian, and likelihood-based methods, linear regression, and generalized linear regression; and a two-course sequence on collaboration in biomedical science. Students are expected to receive a grade of B– or better in core courses and maintain an overall GPA of at least 3.0. Modifications to the core curriculum may be made with written approval from the Director of Graduate Studies as part of an individualized academic plan. Students are required to pass the M.S./Ph.D. series 1 at the Ph.D. level and the Ph.D. series 2 applied comprehensive examinations, and the doctoral qualifying examination, at which time they may earn a non-thesis M.S. (in passing). They are required to serve as a teaching assistant for at least four approved courses. They need to submit a doctoral dissertation that details original research and methodological contributions that advance the knowledge of the discipline of biostatistics and defend their dissertation to their dissertation committee in an open forum.

RESPONSIBLE CONDUCT OF RESEARCH (RCR) REQUIREMENT

Collaborative Institutional Training Initiative (CITI) training and either (i) BIOS 6004 or (ii) IGP 8004.

REQUIRED COURSES (credit hours)

RESEARCH
BIOS 8999 Non-candidate Research (0-12)
BIOS 9999 PhD Dissertation Research (0-12)

CORE COURSES[1] (29 credit hours)
BIOS 6311 Modern Biostatistics Methodology I (3)
BIOS 6311L Modern Biostatistics Methodology I Lab (1)
BIOS 6312 Modern Biostatistics Methodology II (3)
BIOS 6312L Modern Biostatistics Methodology II (1)
BIOS 6341 Fundamentals of Probability (3)
BIOS 6341L Fundamentals of Probability Lab (1)
BIOS 6342 Contemporary Statistical Inference (3)
BIOS 6342L Contemporary Statistical Inference Lab (1)
BIOS 7345 Advanced Regression for Independent Data (3)
BIOS 7345L Advanced Regression for Independent Data Lab (1)
BIOS 7351 Statistical Collaboration in Health Sciences I (3)
BIOS 7352 Statistical Collaboration in Health Sciences II (3)
BIOS 8361 Advanced Probability and Stochastic Processes (3)
[1] All labs for core courses are required except with approval from the Director of Graduate Studies.

ELECTIVES[2] (9 or more courses and associated labs, if any)
EPID 8311 Epidemiologic Theory and Methods I (4) **OR** BIOS 6306 Introduction to Study Design (3)
BIOS 6321 Clinical Trials and Experimental Design (3)
BIOS 7323 Applied Survival Analysis (3)
BIOS 7323L Applied Survival Analysis Lab (1)

BIOS 7330 Regression Modeling Strategies (3)
BIOS 7330L Regression Modeling Strategies Lab (1)
BIOS 7337 Bayesian Data Analysis (3)
BIOS 7337L Bayesian Data Analysis Lab (1)
BIOS 7346 Advanced Regression for Correlated Data (3)
BIOS 7346L Advanced Regression for Correlated Data Lab (1)
BIOS 8365 Advanced Statistical Learning (3)
BIOS 8366 Advanced Statistical Computing (3)
BIOS 8375 Causal Inference (3)
BIOS 8376 Advanced Clinical Trials (2)
BIOS 8377 Statistical Methods for Neuroimaging (2)

[2] All non-core courses offered by the Biostatistics program are approved elective courses. Each of EPID 8311 (or BIOS 6306), BIOS 6321, BIOS 7323, and BIOS 7346 are strongly recommended unless a similar graduate-level course has been completed. In addition, independent studies and graduate-level courses in other fields can qualify with approval from the Director of Graduate Studies.

REQUIREMENTS FOR THE MASTER OF SCIENCE

Candidates for the M.S. must complete eight core courses and at least four approved elective courses (and associated labs, if any). Students must earn credit for a minimum of 30 formal, didactic hours. The core curriculum includes: a two-course theory sequence on probability and inference; a two-course methodology sequence on foundational frequentist, Bayesian, and likelihood-based methods, linear regression, and generalized linear regression; a two-course sequence on collaboration in biomedical science; and introductory courses on epidemiologic theory and clinical trials. Students are expected to receive a grade of B– or better in core courses and maintain an overall GPA of at least 3.0. Modifications to the core curriculum may be made with written approval from the Director of Graduate Studies as part of an individualized academic plan. Students who are working to earn an M.S. in Biostatistics concurrently with a Ph.D. in a related field may be eligible for a waiver of the elective course requirement. Students must pass the M.S./Ph.D. series 1 comprehensive examinations at the M.S. level. They need to submit a master's thesis detailing an original investigation in theoretical or applied biostatistics methodology and present their thesis to their thesis committee, typically in a closed forum.

RESPONSIBLE CONDUCT OF RESEARCH (RCR) REQUIREMENT

Collaborative Institutional Training Initiative (CITI) training and either (i) BIOS 6004 or (ii) IGP 8004.

REQUIRED COURSES (credit hours)

RESEARCH
BIOS 7999 Master's Thesis Research (0-6)

CORE COURSES[3] (28 or 29 credit hours)
EPID 8311 Epidemiologic Theory and Methods I (4) OR BIOS 6306 Introduction to Study Design (3)
BIOS 6311 Modern Biostatistics Methodology I (3)
BIOS 6311L Modern Biostatistics Methodology I Lab (1)
BIOS 6312 Modern Biostatistics Methodology II (3)
BIOS 6312L Modern Biostatistics Methodology II (1)
BIOS 6321 Clinical Trials and Experimental Design (3)

BIOS 6341 Fundamentals of Probability (3)
BIOS 6341L Fundamentals of Probability Lab (1)
BIOS 6342 Contemporary Statistical Inference (3)
BIOS 6342L Contemporary Statistical Inference Lab (1)
BIOS 7351 Statistical Collaboration in Health Sciences I (3)
BIOS 7352 Statistical Collaboration in Health Sciences II (3)
[3] All labs for core courses are required, except with approval from the Director of Graduate Studies.

ELECTIVES[4] (4 or more courses and associated labs, if any)
BIOS 7323 Applied Survival Analysis (3)
BIOS 7323L Applied Survival Analysis Lab (1)
BIOS 7330 Regression Modeling Strategies (3)
BIOS 7337 Bayesian Data Analysis (3)
BIOS 7337L Bayesian Data Analysis Lab (1)
BIOS 7345 Advanced Regression for Independent Data (3)
BIOS 7345L Advanced Regression for Independent Data Lab (1)
BIOS 7346 Advanced Regression for Correlated Data (3)
BIOS 7346L Advanced Regression for Correlated Data Lab (1)
BIOS 8361 Advanced Probability and Stochastic Processes (3)
BIOS 8365 Advanced Statistical Learning (3)
BIOS 8366 Advanced Statistical Computing (3)
BIOS 8375 Causal Inference (3)
BIOS 8376 Advanced Clinical Trials (2)
BIOS 8377 Statistical Methods for Neuroimaging (2)
[4] All non-core courses offered by the Biostatistics program are approved elective courses. Meeting elective requirements through completion of 7000-level electives is strongly recommended unless a similar graduate-level course has been completed. Enrollment in 8000-level courses may require permission of the course instructor in consultation with the Director of Graduate Studies. In addition, graduate-level courses in other fields can qualify with approval from the Director of Graduate Studies. This option is primarily used by students earning an M.S. in biostatistics concurrently with a Ph.D. in another field.

RESEARCH EXPECTATIONS

Independent research in biostatistics must be a creative and substantial original contribution to the field of biostatistics, involving the development and evaluation of biostatistical methodology that has application to important biomedical problems. A dissertation or thesis typically includes some combination of: development of new biostatistics methodology; extension, innovative application, and/or comparison of existing statistical methods in biomedical research; conduct of empirical simulation studies; and dissemination of open-source statistical software to facilitate broad implementation. Dissertations and theses from prior students can be found in the Vanderbilt University Institutional Repository.

Students are encouraged, but not required, to apply for internal and/or external funding to support their research.

PUBLICATION PLAN

Often a dissertation will take the form of three related manuscripts that could be published in the peer-reviewed literature; a thesis will take the form of a single manuscript. Students are not required to publish their research to obtain their degree. However, students are strongly encouraged to submit manuscripts from their research for publication, both during their graduate study and after graduation. Thus, students and their research advisors are required to create a post-graduation publication plan. This non-binding document, which must be submitted to the Program Manager when scheduling the thesis or dissertation defense, would establish intentions, options, and plans for publication of each of the eligible products. For example, for students moving into jobs that prioritize publication, plans may include continuing regular committee meetings while manuscripts are being prepared for submission. Alternatively, for students moving into jobs for which prioritizing publication will be difficult, plans may include options for handing off manuscript drafts, code, and data.

TRAINING FOR THE PROFESSION

RESEARCH ASSISTANTSHIP

Biostatistics is a collaborative profession by its very nature. Therefore, training in a collaborative research environment is a critical component of a graduate student's education in biostatistics. At Vanderbilt, the primary mode for advancing this training is through closely supervised research assistantships (RAs), although students often have other opportunities to get involved in collaborative research outside of these formal arrangements. RAs provide a unique opportunity for students to work closely with faculty on both applied and methodological research. Senior students help faculty facilitate research activities—a critical role that allows faculty to efficiently impart their expertise and improve their academic productivity. Students become highly successful research apprentices largely because RA training provides a closely supervised and extended learning opportunity in which students can learn to apply and refine their statistical and communication skills.

For students on the Ph.D. track, RAs typically begin during the Fall semester of the second year; students entering the Ph.D. program with an M.S. degree in biostatistics or a closely related field are typically assigned an RA in their first year. The Director of Graduate Studies works with RA supervisors to identify students who are a 'match' with, or who can contribute to, an ongoing project. Efforts are made to continue, or further, any existing collaborations in which the student is currently engaged. In the absence of an obvious pairing, students are matched to potential RAs based on their methodological skill set, prior experience, professional interests, and opportunity.

It is standard policy for every RA to have a primary supervisor in the Department of Biostatistics, whose role is to supervise the research assistant and provide professional mentorship. This supervisor may or may not be the student's dissertation advisor. RA effort and work product will be closely monitored by the supervisor, who is also responsible for facilitating a professional environment and professional communication between the research team and biostatistics collaborators.

EXPECTATIONS AND DUTIES

RAs are expected to behave and dress professionally, maintain frequent communication with their supervisor and colleagues, perform the job in a satisfactory manner, meet deadlines on time, and maintain

good academic standing in the program. Communication is a key element of successful collaboration. Assistantship duties are varied, and can include data cleaning, database support, reporting on data quality, developing analysis plans, executing analysis plans, reporting on completed analyses, study designing, statistical coding, computational and simulation support, methodological development, literature review, technique exploration, manuscript preparation, grant writing, and presentations development.

Most research assistantships are funded by the National Instituted of Health (NIH), which means that students cannot accept any other form of financial support from a Vanderbilt or NIH source (small honorariums and travel support are exceptions). Questions about this should be directed to the Program Manager or Director of Graduate Studies.

Continuation of funding is dependent upon the student making good academic progress in the program (as determined by their dissertation advisor, dissertation committee, and the Director of Graduate Studies) and satisfactory performance on their research assistantship. When these conditions are met, funding typically lasts for at least five years.

WORKING HOURS AND VACATION

A full RA is equivalent, in working effort, to a half-time staff position (20 hours per week). This effort does not have to be equally distributed throughout the year, but the distribution must be respectful of project deadlines and classroom responsibilities. For example, students might work fewer than 20 hours per week during the school year (36 weeks) and more than 20 hours per week over the summer (10 weeks). Project deadlines will ultimately dictate how this effort is spread over the year; RAs are encouraged to discuss this with their RA supervisor.

RAs are sometimes expected to be productive beyond the traditional workweek from 9am to 5pm. Evenings, weekends, summers, and academic breaks are often excellent times to engage in research activities. When meetings (RA, research, or otherwise) happen outside working hours, the meeting location must be appropriate and comfortable for all (e.g., on campus, public coffee house, or public restaurant for lunch meeting). Graduate students are not expected to be available 24 hours a day for 7 days a week. Rather, it is hoped that graduate students excited by their RA collaboration or independent methodological research will embrace the project during highly active times.

Based on NIH guidelines, students receive 15 days of sick leave and three weeks (15 calendar days) of vacation leave annually, in addition to University Official Holidays. Plans for how sick leave will be handled should be discussed with the RA supervisor. From project to project, there is wide variation in how this time will be tracked; students can often ‘make-up’ time by accomplishing computational tasks at home. If you are sick, please stay home and inform your supervisor. Vacation timing should be coordinated with the RA supervisor, as well. Extended vacations, especially to international destinations for which visa issues might arise, should be discussed with the Director of Graduate Studies. International travel that exceeds more than 30 days will result in a pause in RA pay while away.

Students sitting for the comprehensive examinations are not expected to work on days when the examinations are administered (usually in late May or early June). A student should, however, communicate these dates to their RA supervisors well in advance.

TEACHING ASSISTANTSHIP

Serving as a teaching assistant (TA) is an important part of graduate training and education, which allows students to improve their communication and organizational skills, develop a deeper understanding of course materials, serve as a role model to junior students, and work with a faculty member in a context outside research.

Students on the Ph.D. track are required to serve as a TA for at least 4 courses that are approved by the Director of Graduate Studies, typically in their third and fourth years. Students on the M.S. track can request to serve as a TA with approval from their thesis advisor. Students who serve as a TA are paid an additional stipend (currently $2000) over the 4 months of the semester.

Roles and responsibilities of the TA vary across courses and instructors, and can include attending lectures and laboratory sessions, grading coursework assignments, holding office hours, proctoring examinations, lecturing, and conducting laboratory sessions. In addition, TAs often serve as an important conduit for feedback between the instructor and students. It is important for the TA and the course instructor to set expectations for the TA's role before the start of the semester. TAs receive feedback on their performance via course evaluations completed by students.

A Self-paced Teaching Assistant Orientation (TAO) is offered by VU AdvancED: The Institute for the Advancement of Higher Education. TAO is designed to assist new TAs as they prepare for their first semester of teaching at Vanderbilt. TAO offers effective strategies for the varied teaching duties that TAs assume, foundational teaching principles and evidence-based practices, and information on institutional policies and resources.

COMMUNITY ENGAGEMENT

Students are expected to be good citizens and engage with the department and their fellow students. Community engagement includes attendance at department seminars (Wednesdays at 1:30pm Central), meeting with seminar speakers and other guests, participating in new student recruitment and orientation activities, attending student-organized journal clubs, participating in the department's Biostatistics Clinics, and attending other department events.

Seminars are an opportunity to enhance and sharpen critical thinking skills, to apply and synthesize classroom knowledge in real-world settings, to learn how statisticians communicate and exchange ideas outside the classroom, to assess different communication styles, and to stay informed on interesting research in the field. Seminars provide exposure to current topics and innovative solutions to interesting problems. They are the statistical practitioner's essential tool for maintaining professional growth after graduation. And, of course, giving a good seminar is an important step in securing a job offer, just as evaluating the quality of a seminar is essential to making good hiring decisions.

Students are expected to attend the department's weekly statistical seminars and any subsequent after-seminar discussions. Students may occasionally miss a seminar for personal or professional reasons. However, it is expected that the average attendance will be at least 80% of the student body. This means students are required to attend at least 80% of seminars each year (with approximately 30 seminars per year, the 80% benchmark is 24 seminars per year). Students must register their attendance at seminar via a code provided at the seminar and submitted by text message. The 80% attendance requirement can be waived by the Director of Graduate Studies if unavoidable conflicts arise.

ADVISING AND MENTORING

ACADEMIC ADVISOR

All entering students are assigned a faculty academic advisor. The academic advisor's role is to monitor the student's academic progress during the first years of the program, assist with the development of an academic plan (particularly in the situation that a comprehensive examination is not passed), and help to identify potential research topics and a research advisor. Students should expect to meet with their academic advisor at least twice per year until successfully completing the comprehensive examinations, at which time a research advisor (doctoral advisor for Ph.D. students, thesis advisor for M.S. students) should be identified, who then will be responsible for advising and mentoring.

ORAL QUALIFYING EXAMINATION COMMITTEE (Ph.D.)

Students on the Ph.D. track who pass the comprehensive examinations must assemble a qualifying examination committee and complete the oral qualifying examination, which typically occurs in their third academic year. Students should choose their committee in consultation with their advisor. The committee must have a minimum of four voting members, including a committee chair who is not the advisor but may be any biostatistics graduate faculty member who is a voting member of the committee. Voting members of the committee must include three graduate faculty (i.e., Department of Biostatistics faculty with a Ph.D., ScD, or DrPH in Biostatistics or Statistics), one of whom is the student's advisor. Voting members of the committee must also include one faculty member from Vanderbilt at large who is not in Biostatistics, Statistics, or Mathematics; faculty not possessing a Ph.D. (e.g., School of Medicine faculty who hold an MD) are eligible to participate as voting members of the committee. The composition of the committee must be approved by the Director of Graduate Studies. The Request to Appoint Ph.D. Committee form must be completed in Kuali at least one month in advance.

The qualifying examination committee is responsible for administering the oral qualifying examination and will determine whether the student is prepared to independently pursue doctoral-level research in biostatistics.

DISSERTATION ADVISOR AND DISSERTATION COMMITTEE (Ph.D.)

Ph.D. candidates who pass the oral qualifying examination must choose a dissertation advisor and assemble a dissertation committee. The required composition of the committee is identical to that of the qualifying examination committee. The committee members may be the same as those chosen for the oral qualifying examination, but this is not required. The composition of the committee must be approved by the Director of Graduate Studies. The Request to Appointment Ph.D. Committee form must be completed in Kuali.

The dissertation committee is intended to bring specialized expertise and guidance to the student's research, education, and career development. The dissertation committee will serve as a resource for the direction of, and assistance with, independent research in the context of senior sponsorship and oversight. The dissertation advisor is primarily responsible for the overall guidance of the student's research and training. The student must meet with his or her dissertation committee members either as a group or individually soon after completing the oral qualifying examination and every six months thereafter (i.e., at least twice a year). The student, with guidance from their advisor, is responsible for summarizing

committee meetings in written minutes and action items. Copies of this summary must be sent to all committee members and the Director of Graduate Studies and become a part of the student's permanent record.

The dissertation committee is responsible for administering the final Ph.D. examination (i.e., dissertation defense) and will determine whether the candidate has presented an acceptable dissertation and has demonstrated strong proficiency in the five key skill areas during their educational tenure at Vanderbilt.

THESIS ADVISOR AND THESIS COMMITTEE (M.S.)

Students on the M.S. track who successfully complete their first-year coursework and pass the M.S./Ph.D. series 1 comprehensive examinations must select a thesis advisor and thesis committee. The thesis advisor, who will chair the thesis committee, must hold a Ph.D. in Biostatistics or Statistics and be a member of the graduate faculty. The thesis committee includes one additional Vanderbilt faculty member. Ph.D. candidates in other disciplines who are completing an M.S. in Biostatistics are strongly encouraged to enlist a faculty member from their home department as the second committee member.

The thesis committee is responsible for guiding the student in their production of a thesis that provides evidence of original investigation in theoretical or applied biostatistics methodology.

PROGRESS TOWARD THE DEGREE

COMPREHENSIVE EXAMINATIONS

The primary role of the comprehensive examinations is to aid the graduate faculty in assessing whether students are sufficiently prepared for the next stage of their graduate training, including advanced coursework and development of a thesis or dissertation. Students on the M.S. track are expected to take and pass the M.S./Ph.D. series 1 comprehensive examinations at the M.S. level. Students on the Ph.D. track are expected to take and pass the M.S./Ph.D. series 1 at the Ph.D. level and the Ph.D. series 2 applied comprehensive examination. The series 1 examination is identical for students on the M.S. track and the Ph.D. track, although the threshold to qualify for a Ph.D.-level pass is typically around ten percentage points higher than the threshold to qualify for an MS-level pass. The series 2 examination is only applicable to students on the Ph.D. track.

TIMING AND FORMAT

Our department's comprehensive examinations are—without exception—an individual effort. Comprehensive examinations are ordinarily held in late May and/or early June. Students are ordinarily notified of the examination dates in the Fall semester prior to the examinations. Students on an approved leave of absence may coordinate an alternative date for the examinations with the Director of Graduate Studies and the comprehensive examination committee chair. Ordinarily, the M.S./Ph.D. series 1 theory and applied examinations Are conducted as in-class examinations. Ordinarily, the Ph.D. series 2 applied examination is conducted as a take-home examination. Students will be notified of any changes to the timing, format, or structure of the examination if they arise.

The final results for each of the M.S./Ph.D. series 1 examinations can be:

- Passed at the Ph.D. level

- Passed at the M.S. level
- Not passed

The final results for each of the Ph.D. series 2 examination can be:

- Passed
- Not passed

Conditional passes may be issued when deemed appropriate by the comprehensive examination committee. In such cases, the conditions for the pass to be achieved will be made clear when the students are notified of their results. Students who do not pass a comprehensive examination at the required level on their first attempt must take the examination again the following year. For students on the Ph.D. track, passing the series 1 theory examination at the Ph.D. level is typically required to enroll in BIOS 8361. Failure to pass the examination on the second attempt results in removal from the program; students on the Ph.D. track who pass an examination at the M.S. level but do not pass at the Ph.D. level may switch to the M.S. track.

DEVELOPMENT AND EVALUATION

All examinations are created with input from the graduate faculty. All proposed problems are vetted by the sub-committee chair, and by the instructors you would expect to vet them. For example, the questions for the M.S./Ph.D. series 1 theory examination are vetted by the instructors of the first-year theory sequence. Each question is scored by two independent graders. Scores are aggregated and assessed for concordance. Where scores on an individual problem disagree in a meaningful way (very rare), there is a reconciliation effort. Final scores are ranked, at which point the comprehensive examination committee decides upon pass thresholds for each examination. In determining these initial thresholds, committee weighs historical pass thresholds, perceived exam difficulty, and gaps between scores:

- Scores above the Ph.D. threshold constitute automatic Ph.D.-level passes.
- Scores above the M.S. threshold constitute automatic MS-level passes.
- Scores below the target thresholds are not automatically decided, but discussed by the comprehensive examination committee to decide whether a conditional pass is appropriate.

Several factors are weighed when deciding between a pass, conditional pass, or a not-pass, including: performance in first-year courses; scores on each individual problem; and whether a condition can be identified that will set the student up for success in the next stage.

TIPS FOR EXAM PREPARATION

- Study early, and study often!
- Group studying is encouraged but should not be viewed as a substitute for individual studying. Remember that all examinations are an individual effort, and so you will be responsible for your own answers. One way to leverage group-study is to do study individually in advance and come together to discuss your solutions.
- Comprehensive examinations from prior years are available but be mindful that the formats have evolved over the years.
- The prior comprehensive examinations are one resource of many. Do not ignore prior course exams and coursework assignments.

ORAL QUALIFYING EXAMINATION (Ph.D.)

The goal of the oral qualifying examination is to determine if the student is prepared to independently pursue doctoral-level research in biostatistics and if the student can clearly communicate a proficiency with applied and theoretical statistical concepts to statisticians and non-statisticians. The student must demonstrate:

- Excellence in communication skills
- Proficiency with the core Ph.D. curriculum
- Refined critical thinking skills
- Ability to synthesize key concepts in the topic of the student's choosing.

The examination assesses the student's ability to synthesize and communicate advanced statistical concepts and examines the depth and breadth of the students' knowledge in biostatistics and biomedicine. The examination is not intended to be solely a dissertation proposal, nor is it intended to reassess a student's technical competency. Rather, the intent of the examination is to gauge the students' preparedness for pursuing doctoral research and proficiency in communicating statistical concepts to a broad audience.

Examinations are closed to the public and last approximately two hours. To help focus on the examination, the student prepares and presents a literature review or an active exploration of an advanced statistical method or concept. The presentation typically takes 30 minutes. The student also prepares an overview document that summarizes their review or exploration and demonstrates synthesis, familiarity, and command of the topic as well as outlining potential avenues of future research. The student must submit the document to the examination committee 14 days in advance of the examination. Note: students are not required to continue working on this topic area after the examination. The student works closely with a faculty member to prepare this document and that faculty member typically, but not required, serves as the student's advisor and advocate up to and throughout the examination.

There are three possible outcomes of the examination: pass; conditional pass (conditions to be set by the doctoral qualifying examination committee and subsequently approved by the Director of Graduate Studies); and fail. On satisfactory completion of the examination (i.e., pass or conditional pass with conditions met), the student is admitted to candidacy. In the case of failure, the student has six months to retake the examination. The doctoral qualifying committee, with approval of the Director of Graduate Studies, will determine the date of the second examination. Failure in the second examination will result in dismissal from the doctoral program.

The oral qualifying examination should be completed in the Spring semester of the student's third academic year. The Request to Schedule Qualifying Examination form must be completed in Kuali at least four weeks prior to the examination date.

Students on the Ph.D. track who successfully complete the oral qualifying examination, along with completing the required core courses, may earn a non-thesis M.S. (in passing). To apply for the M.S. in passing, you will need to complete a graduation intent form in Your Enrollment Services (YES). You should see the non-thesis M.S. in passing option listed on the Intent to Graduate in YES.

DISSERTATION AND DISSERTATION DEFENSE (Ph.D.)

Ph.D. candidates must present a dissertation that provides clear evidence of original research and methodological contributions that advance the knowledge of the discipline of biostatistics. Often, a dissertation will take the form of three related manuscripts that could be published in the peer-reviewed literature.

Dissertation defenses are administered in two parts, the first of which is open to the public. In the first part, candidates present their dissertation work in a 45- to 60-minute presentation and take questions from audience and committee members. In the second part of the examination, which is closed to the public, the committee members may ask questions or discuss any relevant substantive or methodologic issues that remain or should be revisited. After this second period of questions and discussion, the committee deliberates in private. The chair of the dissertation committee is responsible for running the examination and informs the Director of Graduate Studies in writing of the results of the dissertation defense, including completion of any required revisions. If all other requirements are satisfied, then the Director of Graduate Studies notifies the Dean of the Graduate School that the student has completed the requirements for the Ph.D. degree.

The dissertation defense must be completed within four years of the student's admission to candidacy for the degree (i.e., after successful completion of the oral qualifying examination). The Request to Schedule Final Defense form must be completed in Kuali at least four weeks prior to the examination date.

THESIS AND THESIS PRESENTATION (M.S.)

Students on the M.S. track must produce a thesis that provides evidence of original investigation in theoretical or applied biostatistics methodology. The thesis may be as brief as a publishable paper detailing the biostatistical investigation accompanied by an introductory chapter.

In the thesis presentation, the candidate presents their thesis to their thesis advisor and thesis committee, typically in a closed forum.

SUMMARY AND TYPICAL SCHEDULE

DOCTOR OF PHILOSOPHY

REQUIREMENTS

- Earn 72 total credits
    - 8 core courses and associated labs, if any
    - 9 or more elective courses and associated labs, if any
    - BIOS 8999 Non-candidate Research
    - BIOS 9999 PhD Dissertation Research
- Fulfill the responsible conduct of research requirement
    - Collaborative Institutional Training Initiative (CITI) training
    - BIOS 6004 or IGP 8004
- Maintain an overall grade point average of 3.0 or better
- Achieve a grade of B– or above in core courses
- Attend 80% of department seminars

- Pass M.S./Ph.D. series 1 and Ph.D. series 2 comprehensive examinations at the Ph.D. level
- Complete oral qualifying examination and dissertation defense (seminar)
- Submit a Ph.D. dissertation within 4 years of completing qualifying examination
- Submit publication plan
- Teaching assistant for at least 4 approved courses

TYPICAL SCHEDULE

Year 1		
Fall	Spring	Summer
BIOS 6311 and BIOS 6311L	BIOS 6312 and BIOS 6312L	BIOS 8999 (0 hours)
BIOS 6341 and BIOS 6341L	BIOS 6342 and BIOS 6342L	
EPID 8311 or elective	BIOS 6321 or elective	
BIOS 6004		
	IGP 8004 if BIOS 6004 not taken	
	Series 1 comprehensive examinations	

Year 2		
Fall	Spring	Summer
BIOS 7345 and BIOS 7345L	BIOS 7352	BIOS 8999 (0 hours)
BIOS 8361	BIOS 7346 and BIOS 7346L or elective	
BIOS 7351	Advanced electives	
BIOS 7323 or elective		
	Series 2 applied comprehensive examination	

Year 3		
Fall	Spring	Summer
Advanced electives	Advanced electives	BIOS 9999 (0 hours)
BIOS 8999	BIOS 8999	
Teaching assistant	Teaching assistant	
	Oral qualifying examination	

Year 4		
Fall	Spring	Summer
BIOS 9999	BIOS 9999	BIOS 9999 (0 hours)
Teaching assistant	Teaching assistant	

Year 5	
Fall	Spring
BIOS 9999	BIOS 9999
	Dissertation defense

MASTER OF SCIENCE

REQUIREMENTS

- Earn 30 didactic credits
    - 8 core courses and associated labs, if any
    - 4 or more elective courses and associated labs, if any

- Enroll in BIOS 7999 Master's Thesis Research
    - Typically enroll for 0 hours
- Fulfill the responsible conduct of research requirement
    - Collaborative Institutional Training Initiative (CITI) training
    - IGP 8004 or BIOS 6004
- Maintain an overall grade point average of 3.0 or better
- Achieve a grade of B– or above in core courses
- Attend 80% of department seminars
- Pass M.S./Ph.D. series 1 comprehensive examinations at the M.S. level
- Submit an M.S. thesis and present to the thesis committee
- Submit publication plan

TYPICAL SCHEDULE

Year 1	
Fall	Spring
BIOS 6311 and BIOS 6311L	BIOS 6312 and BIOS 6312L
BIOS 6341 and BIOS 6341L	BIOS 6342 and BIOS 6342L
EPID 8311	BIOS 6321
BIOS 8004	
	IGP 8004 if BIOS 6004 not taken
	Series 1 comprehensive examinations

Year 2	
Fall	Spring
BIOS 7351	BIOS 7352
Electives	Electives
BIOS 7999	BIOS 7999
	Thesis presentation

ACADEMIC INTEGRITY

Vanderbilt University students pursue all academic endeavors with integrity. The Vanderbilt University Student Handbook describes University policies on academic integrity.

NON-DISCRIMINATION

Vanderbilt University is committed to encouraging and sustaining a learning and work community that is free from prohibited discrimination, harassment, and retaliation. The Vanderbilt University Student Handbook describes University policies on discrimination.

Vanderbilt University prohibits and seeks to eliminate all forms of gender harassment and sexual misconduct, including sexual harassment, sexual assault, stalking, and intimate partner violence, which includes dating violence, domestic violence.

INTERNATIONAL STUDENTS

To support international students, we encourage students to contact Vanderbilt's International Student & Scholar Services (ISSS) office. ISSS fosters the education and development of non-domestic students and scholars to enable them to achieve their academic and professional goals and objectives. ISSS staff provide advice, counseling, and advocacy regarding immigration, cross-cultural, and personal matters. They also support an environment conducive to international education and intercultural awareness via educational, social, and cross-cultural programs.

OTHER RESOURCES

The Vanderbilt Graduate School offers a wide array of student support resources for health, wellness, student life and identity, academic support, funding, professional development, and administrative assistance. In addition, the Office of Biomedical Research Education and Training (BRET) provides support and resources for Vanderbilt biomedical graduate students, including career and professional development, research resources and funding, wellness and counseling, student financials and travel, student support guidelines and policies, campus communities, campus services, and international student resources.

BIOSTATISTICS GRADUATE STUDENT ASSOCIATION

The Vanderbilt Biostatistics Graduate Student Association (BGSA) was founded in 2016 by a group of enthusiastic students. It is a recognized organization of Vanderbilt University as well as an ASA student chapter. The BGSA's mission is to facilitate an environment for students to engage in discussions regarding biostatistics and data science concepts to further their knowledge and understanding of the current state of the field. Currently, the BGSA functions primarily to host bi-monthly student-run journal clubs. The BGSA officers consist of a president, vice president, treasurer, secretary, and first-year liaison.

PROFESSIONAL TRAVEL

Students are encouraged to attend and present at professional meetings. $1000 travel awards are available from the Graduate School for students presenting at a professional meeting (1 award per year, with a maximum of 3 awards while a student). Limited travel funding is available from the department. Therefore, students are encouraged to seek funds from their research advisor, RA supervisor, or sponsored student travel awards through student paper competitions.

All students are required to follow the VU Travel Policy. Acting outside of the policy may lead to non-reimbursable expenses. The BRET Office has developed these Travel Procedures to guide students' travel plans to ensure they stay within the VU Travel Policy, travel safely, and are reimbursed quickly. The BRET student Intent to Travel Redcap must be completed one month before travel. Contact the Program Manager with questions regarding travel.

FREQUENTLY ASKED QUESTIONS

1. How do I transfer credits from a prior graduate program?

   Many students will enter the Biostatistics graduate program with previous graduate credit. At the time the program of studies is planned, transferring this work to the Vanderbilt record must be considered. The Biostatistics program allows a maximum of 6 hours transfer credit to be applied toward the elective course requirements for the Ph.D. degree and a maximum of 16 hours transfer credit to be applied toward the core course requirements for the Ph.D. degree (the latter for incoming students who pass the series 1 comprehensive examination at the Ph.D. threshold prior to matriculation). Transfer of credits should be completed before the end of the first semester of enrollment. This early assessment is essential for planning the student's program of study. The Graduate Transfer Credit Request form should be completed in Kuali.

2. How do I get a VUMC Dual ID?

   Students who require access to systems or resources owned by both Vanderbilt University (VU) and Vanderbilt University Medical Center (VUMC) may need dual identities. These unique individuals are known as dual identity users and have two IDs. Dual identities at VU and VUMC have individual login credentials that provide access to each organization's applications and systems. An ID/username at VU is called a VUnet ID, and an ID/username at VUMC is called a VUMC ID. Passwords must be set for each. Please contact the Program Manager to request a VUMC ID.

3. Can a student switch from the M.S. track to the Ph.D. track?

   Yes. Students on the M.S. track who pass the series 1 theory and applied comprehensive examinations at the Ph.D. level may have the opportunity to formally apply to the Ph.D. program. Any students interested in a change of track are encouraged to engage in conversations with their academic advisor and the Director of Graduate Studies. Passing the series 1 comprehensive examinations at the Ph.D. level does not automatically initiate a formal application for a track switch, nor does it guarantee eventual admission to the Ph.D. program. In Fall semester of the second year, students should register for BIOS 7345 and BIOS 8361. Factors considered by the Admissions Committee include not only performance on series 1 comprehensive examinations, but performance in coursework and overall engagement in the program. Admission to the Ph.D. program from the M.S. program is also contingent upon the availability of funding.

4. What if I require a leave of absence?

   Please send an email to the Director of Graduate Studies and Program Manager to formally request a leave of absence. Include the reason for absence and beginning and end dates. A leave of absence may be requested for personal reasons other than health and parental accommodation for up to 12 months, and renewable for a maximum of four years.

5. Can I participate in an internship?

   The graduate program recognizes that students may wish to obtain practical experience outside of the program, as well as prepare for potential employment opportunities, by participating in an internship,

which typically takes place over the summer. To participate in an internship, students should be making good academic progress in the program, particularly with respect to the expected timeline for completing the oral qualifying examination. Students who plan an internship must first discuss it with their RA supervisor prior to applying and obtain approval from the supervisor when the internship is offered. Students in a full-time paid internship must complete the BRET Financial Termination Survey to discontinue their RA funding while being paid by an internship. Students can continue their RA funding and work (30 hours per week during the summer) while being paid by a part-time internship (up to 10 hours per week). Due to the potential disruption of RA work, particularly over the summer (see "Research Assistantship" on Page 5), students can expect to participate in at most one summer internship over the course of their graduate studies. The Program Manager must be notified about participation in any (paid or unpaid) internship. Final approval must be obtained from the Director of Graduate Studies.

6. What are the major deadlines for graduation?

   The Graduate School Academic Calendar includes important dates and deadlines for graduation. Note that to graduate in a particular semester, the deadline to submit a thesis or dissertation is typically several weeks in advance of the graduation date.

7. How do I access important doctoral forms?

   Ph.D.-track students can utilize the Doctoral Workflow form in Kuali to request to:
   - Appoint/modify Ph.D. committee
   - Schedule/modify qualifying examination
   - Schedule/modify dissertation defense
   - Extend deadline to enter candidacy
   - Extend candidacy (to defend and graduate)
   - Submit the results of the qualifying exam
   - Submit the results of the dissertation defense

   See the User Guide for Students for instructions. When these forms are submitted, please inform the Program Manager and Director of Graduate Studies by email.

8. Who do I contact?
   - Chazlie Miller: chazlie.miller@vanderbilt.edu
     - Student pay
     - Student costs and financials
     - Credit transfers
     - Schedule oral qualifying examination
     - Schedule dissertation defense
     - Intent to graduate
     - Travel award requests
     - Room scheduling
   - Andrew Spieker: andrew.spieker@vumc.org (use andrew.spieker.1@vanderbilt.edu for Graduate School travel awards)
     - Courses
     - Curriculum
     - Requests for extension

    - Requests for leave of absence
    - Elective courses outside our program
    - Independent study requests
    - Any other concern or issue
- Academic Advisor
    - Monitor progress
    - Identify research advisor
    - Academic plan
- Qingxia (Cindy) Chen: cindy.chen@vumc.org
    - Student affairs
- Simon Vandekar: simon.vandekar@vumc.org
    - Admissions and recruitment
- Andrew Spieker: andrew.spieker@vumc.org
    - Comprehensive examinations
- Alexis Fleming: alexis.w.fleming@vanderbilt.edu
    - Biostatistics Graduate Student Association (BGSA)