STATISTICAL SCIENCE, PHD

Banner Code: EC-PHD-STAT

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The PhD in Statistical Science represents the highest academic attainment for a statistician and, as such, requires in-depth knowledge of modern statistical theory and practice. The degree program is a hybrid of theory, computation, and data analysis; and students are expected to be proficient in all three. Current research areas of key department faculty in the program include biostatistics, modern statistical methodology, big data, data analytics, statistical or machine learning, applied probability, statistical networks, statistical computing, statistical imaging, bioinformatics, financial statistics, Bayesian statistics, data confidentiality, and statistics interfaced with other disciplines.

Admissions & Policies

Admissions

We welcome applications to our PhD program from students with a bachelor's or a master's degree earned with a minimum 3.5 GPA on a 4.0 scale in the fields of Mathematics, Statistics, Computer Science, Engineering, or any other discipline (including social science) with training in mathematics and at least one course in advanced calculus, MATH 315 Advanced Calculus I or equivalent, successfully completed with a grade of B of better.

Students entering with a master's degree may receive a transfer of credit (see AP.6.5. (https://catalog.gmu.edu/policies/academic/graduatepolicies/#ap-6-5-2)). Students should have completed coursework equivalent to STAT 544 Applied Probability, STAT 554 Applied Statistics I and STAT 652 Statistical Inference. If not, students may be required to take them as part of the degree program (with a transfer credit reduction for their MS degree).

Specific application deadlines and requirements (https://www2.gmu.edu/ admissions-aid/apply-now/how-apply/graduate/) are available through the Office of Graduate Admissions. Students can find additional details on the Statistics Department Webpage (https://statistics.gmu.edu/ academics/phd-statistical-science/).

Policies

For policies governing all graduate programs, see AP.6 Graduate Policies (https://catalog.gmu.edu/policies/academic/graduate-policies/).

Transfer of Credit

Students must complete a minimum of 72 graduate credits. A maximum of 24 credits from a master's degree in statistics, mathematics, or similar discipline, or 30 credits from a Master's degree from the George Mason University Department of Statistics may be applied to this program. Transfer of credit, AP.6.5. (https://catalog.gmu.edu/policies/academic/ graduate-policies/#ap-6-5-2), requires the approval of the Director(s) of the PhD program in Statistical Science or designee and the dean or designee of the school. They determine whether the credits are eligible

for transfer and applicable to the degree program and the number of credits to be transferred.

Requirements

Degree Requirements

Total credits: 72

The 72 hours of required doctoral-level credits typically consist of 48 credits of regular coursework and 24 credits of dissertation research. The following degree plan is based on a student who receives 24 transfer credits from a prior conferred Master's. Students who receive more or less than a 24 credits of transfer coursework should consult with their advisor.

Doctoral Coursework

Students are required to complete a minimum of 24 credits of advanced emphasis coursework, including six core courses:

Code	Title	Credits
STAT 662	Multivariate Analysis and Statistical Learning	3
STAT 676	Linear Models and Advanced Regression Modeling	3
STAT 778	Statistical Computing	3
STAT 971	Probability Theory	3
STAT 972	Mathematical Statistics I	3
STAT 973	Mathematical Statistics II	3
The remaining two courses are selected and approved by the Dissertation Committee and the Director(s) of the PhD program in Statistical Science and should be numbered 600 or above. ¹		6

Total Credits

24

STAT 652 and STAT 654 do not count toward advanced emphasis coursework, if a student has received 24 transfer credits.

Qualifying Exams

Written qualifying exams will be taken in the following areas:

- · Applied Statistics
- Theoretical Statistics

The exam on Applied Statistics will cover content from three applied courses, including STAT 662 Multivariate Analysis and Statistical Learning, STAT 676 Linear Models and Advanced Regression Modeling and STAT 778 Statistical Computing. The exam on Theoretical Statistics will cover content from three fundamental courses, including STAT 971 Probability Theory, STAT 972 Mathematical Statistics I, and STAT 973 Mathematical Statistics II.

Qualifying exams are offered in August and January. Full-time students who enter the Ph.D. program with a master's degree must take the qualifying exams in August following the year of enrollment. Full-time students who enter the Ph.D. program with a bachelor's degree as their highest degree must take the exams within two years of enrollment.

Part-time students must take the qualifying exams within the first three years of enrollment in the program. The outcomes of the qualifying exams include Pass, Conditional Pass, and Fail. Students who receive a Conditional Pass for an exam are required to meet specific condition(s) as determined by the exam review committee(s) and the graduate program director. If the condition is met by the student prior to the next round of exams, the Conditional Pass is viewed as Pass; Otherwise, it is equivalent to Fail. Students who do not pass both exams in two consecutive exam periods are terminated from the program.

Dissertation Research

In order to advance to candidacy, students must complete all coursework, pass the qualifying exams, and defend a dissertation proposal.

Code	Title	Credits
Select 24 credits from the following:		
STAT 990	Dissertation Topic Presentation (required)	
STAT 998	Doctoral Dissertation Proposal	
STAT 999	Doctoral Dissertation (must complete a minimum of 12 credits)	
Total Credits		24

Dissertation Committee Selection

Following successfully passing the qualifying exams, students should identify a dissertation director who is willing to work with them and together assemble a Dissertation Committee.

Dissertation Committee Composition:

- Chair. The chair, also referred to as the dissertation director (advisor), must be a full-time faculty member in the Department of Statistics and hold Mason graduate faculty status.
- Co-chair (optional): A Co-chair, who usually serves as the dissertation co-advisor, may be included on the committee. The only requirement for service as Co-Chair is Mason graduate faculty status.
- Internal Members: The committee must include two additional Mason faculty members from the Department of Statistics, at least one must be full-time, and both must hold Mason graduate faculty status. The Co-Chair, if designated, may fulfill one of these internal member roles, provided they meet all requirements.
- External Member. There must be one external member who is not part of the core faculty of the Department of Statistics but holds Mason graduate faculty status.
- Full Professor. At least one committee member must hold the rank of Full Professor.

For additional specifications, see AP.6.10.5 (https://catalog.gmu.edu/ policies/academic/graduate-policies/#ap-6-10-5) of the University Catalog.

The Dissertation Committee must be approved by the Director(s) of the PhD program in Statistical Science.

In the PhD in Statistical Science program, the Dissertation Committee, chaired by the dissertation advisor, administers, reviews and determines the outcome of doctoral degree milestones including the dissertation proposal defense, the dissertation predefense, and final defense. The Dissertation advisor/committee may also require a PhD candidate to meet requirements for academic research publications and other academically-relevant activities in addition to the minimum formal degree requirements articulated in the university catalog.

Student disagreements with any committee evaluation must be reviewed by the committee, with the Department Chairperson as the last arbiter of the appeal. The Department Chairperson's role is to ensure that no procedural irregularities have occurred. The decision of the Department Chairperson is final and is not subject to appeal. See AP.6.10 (https:// catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-10). of the University Catalog.

Advancement to Candidacy

Admission to candidacy is acquired on completion of a dissertation proposal examination. A dissertation proposal examination consists of:

- A proposal manuscript containing a problem statement, a review of related scholarly work, preliminary results, and an outline of the work to be conducted.
- An oral proposal presentation and a subsequent examination by the Dissertation Committee on aspects within the scope of the proposal that pertain to principles and questions fundamental to the field of Statistics. The presentation and examination are attended by the Dissertation Committee and the Director(s) of the PhD program in Statistical Science.

A student who fails the dissertation proposal examination may take it a second time, within six months. If the student fails a second time, the student is terminated from the program.

Doctoral Defense

The dissertation defense serves as the student's final examination and is conducted by the Dissertation Committee.

Pre-defense. Prior to the final public defense, the candidate must hold a pre-defense meeting with the dissertation committee. Only the candidates and committee members are required to attend. The written dissertation must be provided to the committee at least two weeks prior to the pre-defense. Upon approval by the committee that the dissertation is ready for defense, the candidate may submit the Approval to Defend Form and proceed to schedule the final public defense.

Defense. The final defense consists of a 45-minute presentation by the candidate, followed by an oral examination conducted by the dissertation committee, and both are open to the public.

If the candidate successfully defends the dissertation, the dissertation committee recommends that the final version of the dissertation, including any required corrections and revisions, be completed under the supervision of the dissertation director, and that the graduate faculty of George Mason University accept the candidate for the PhD degree.

If the candidate does not successfully defend the dissertation, they may request a second opportunity to defend, typically in the following academic semester. A second pre-defense is not required. For the second defense, the candidate is not required to repeat the public presentation unless the committee specifies otherwise. The oral examination may be held privately without public attendance. The second defense must be approved by all members of the dissertation committee. A candidate who fails a second attempt to defend the dissertation is terminated from the PhD program.