Psychological & Brain Sciences

The Department of Psychological & Brain Sciences teaches graduate students who are interested in becoming the next generation of academic researchers and educators in psychological and brain sciences. Graduate study may be undertaken in the following general areas: Behavior, Brain & Cognition; Clinical Psychology; Aging & Development; and Social & Personality Psychology. The traditions of Washington University and the department encourage interdisciplinary graduate study, both between the subfields of psychological and brain sciences and across other disciplines. Therefore, although students must affiliate with at least one of the areas within psychological and brain sciences, they are frequently affiliated with multiple areas within the field. In addition, many graduate students in the department also engage in interdisciplinary learning, scholarship and research. For example, cross-disciplinary opportunities and research are available in the Division of Biology and Biomedical Sciences (e.g., neuroscience, genetics); in the programs of Linguistics and of Cognitive, Computational, and Systems Neuroscience; in African-American Studies; and in Philosophy-Neuroscience-Psychology, as well as in several departments in the School of Medicine and McKelvey School of Engineering.

The Department of Psychological & Brain Sciences admits students for full-time study toward the **PhD** and does not offer a terminal master's degree. However, students are required to complete a master's degree with a thesis as part of the requirements for a PhD. In addition, the PhD includes required courses (including statistics, methods, ethics and several core content areas), a subject matter exam, at least two semesters of a teaching experience to fulfill the doctoral teaching requirement, and consistently high-quality research productivity that results in publishable findings.

The Department of Psychological & Brain Sciences also offers the **Graduate Certificate in Quantitative Data Analysis,** which is open to graduate students of various disciplines. Advanced skills and knowledge in quantitative analysis, methods and interpretation are critical assets for scholars in a wide range of disciplines within the social sciences. In addition, many of the important practical, analytical and conceptual skills are shared across disciplines. Many of the graduate programs in the social sciences include basic quantitative analysis skills within the core required curriculum of their department, but many students would benefit from advanced preparation in this domain. The certificate program will provide an organized means for students to achieve an advanced level of knowledge and skill in quantitative social science data analysis, interpretation and visualization that can be applied and shared in a variety of occupational domains.

The Graduate Certificate in Quantitative Data Analysis requires students to master both an introductory level and a more advanced level of quantitative skills and knowledge. Some of the introductory-level courses may overlap with courses that are already required within a student's individual PhD program curriculum, but the advanced level will require students to go beyond the basic expectations of their graduate program to achieve a greater depth and breadth of their knowledge and abilities.

Students interested in the Graduate Certificate in Quantitative Data Analysis should first apply for admission to the Washington University department in which they wish to obtain a graduate degree. After being admitted, students should notify their department adviser and the Graduate Certificate in Quantitative Data Analysis program director (dbarch@wustl.edu) (dbarch@wustl.edu) of their plans to obtain the certificate. In addition, students should submit an Application for Admission to Certificate Program form to the Graduate School office and send a copy to the Graduate Certificate in Quantitative Data Analysis office.

| **Phone:** | 314-935-6520 |
| **Website:** | https://psych.wustl.edu/graduate-program (https://psych.wustl.edu/graduate-program/) |

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Degree Requirements
PhD in Psychological & Brain Sciences

The following is a brief listing of the requirements for the PhD in Psychological & Brain Sciences. A more detailed description of these requirements may be found in our Graduate Student Handbook (PDF) (http://bulletin.wustl.edu/grad/gsas/psych/graduate_student_handbook_october_2017.pdf). (https://wustl.app.box.com/s/mv01bcleuxpug2uwymbohkmmrm9st24l/) Students in the clinical science training program have somewhat different requirements; please refer to the Clinical Program Handbook (PDF) (http://bulletin.wustl.edu/grad/gsas/psych/Clinical_Handbook_Current_Jan_2020.pdf) as well.

All students must do the following:

- Complete required graduate-level courses (courses must be completed for a student to be considered "all but dissertation"). A typical semester course load for the first two years is 12 to 13 credit units, unless teaching responsibilities suggest a load of 9 to 10 credit units.
- Obtain teaching experience commensurate with preparation for an academic career. There is a teaching requirement that all students must meet, the details of which are outlined in our Graduate Student Handbook.
- Attend a 1-credit (one hour per week) seminar on research ethics. This typically happens during the fall semester of a student's first or second year in the program.
- Attend at least five professional development workshops over the course of the program.
- Complete a qualifying research project during the first two years of graduate study. This is often referred to as the master's thesis.
- Pass a subject matter examination. This examination must be passed before work on the dissertation can begin.
- Complete a dissertation project and defend it in an oral examination. The research requirements for the PhD are described in more detail in our Graduate Student Handbook.

Graduate Certificate in Quantitative Data Analysis

The goal of the certificate is to ensure that students have a solid basis in probability and statistics, inference, and quantitative research design as well as some depth of experience in a more advanced topic area. As such, students completing the certificate are required to take at least five courses, the categories of which are shown below. Some courses appear in more than one area, but a course can only be used to fill one of the requirements. In consultation with the certificate adviser,

students may substitute equivalent courses or more demanding mathematical treatments of the same course material. For programming prerequisites, visit our Quantitative Data Analysis website (https://psych.wustl.edu/graduate-certificate/).

Core Area Courses (at least one from each area)

Probability and Statistics

Code	Title	Units
L33 Psych 5066	Quantitative Methods I	3
L33 Psych 5067	Quantitative Methods II	3
S50 SWSA 5230	Applied Linear Modeling	
L32 Pol Sci 572	Quantitative Methods in Pol Analysis II: Linear Models (Generalized Linear Models)	3
L32 Pol Sci 581	Quantitative Political Methodology I	3
L32 Pol Sci 582	Quantitative Political Methodology II	3
L48 Anthro 5365	Problems in Applied Data Analysis	3
L11 Econ 508	Mathematics for Economics	3

Inference and Quantitative Research Design

Code	Title	Units
L32 Pol Sci 5024	Causal Inference	3
L33 Psych 5011	Research Designs and Methods	3
L12 Educ 503	Foundations of Educational Research	3
Math 420	Experimental Design (with graduate extension)	3

Focus Area Courses (at least two from one of these three areas)

Longitudinal and Time-Series Data Analysis

Code	Title	Units
SWDT 6600	Multilevel and Longitudinal Modeling	3
SWDT 6905	Propensity Score Analysis	3
L33 Psych 5068	Hierarchical Linear Models	3
L33 Psych 5165	Applied Longitudinal Data Analysis	3
B54 MEC 661	Analysis of Time Series Data	3
L32 Pol Sci 584	Multilevel Models in Quantitative Research	3
MSB 618	Survival Analysis	3

Multivariate and Machine Learning Analysis

Code	Title	Units
L33 Psych 5012	Selected Topics in Design and Statistics	3
L33 Psych 516	Applied Multivariate Analysis	3
CSE 514A	Data Mining	3
CSE 517A	Machine Learning	3

L24 Math 470	Graph Theory (with graduate extension)	3
L24 Math 535	Topics in Combinatorics	3
SWDT 6901	Structural Equation Modeling	3

Data Mining and Specialized Research Tools

Code	Title	Units
SWCD 5082	Foundations of Geographic Information Systems (GIS) for the Applied Social Sciences	3
CSE 514A	Data Mining	3
CSE 517A	Machine Learning	3
M21 MSB 550	Introduction to Bioinformatics	
Math 459	Bayesian Statistics (with graduate extension)	3
L33 Psych 5167	Applied Bayesian Statistics	3
CSE 316A	Social Network Analysis (with graduate extension)	3
L11 Econ 5161	Applied Econometrics	3

The fifth course can be from any of the three focus areas, or it can be a second course from the Probability and Statistics group.