Washington University in St. Louis

Quantitative Data Analysis, Graduate Certificate

Certificate Candidacy

To earn a graduate certificate at Washington University, a student must complete all courses required by their department; maintain satisfactory academic progress; fulfill all academic and residence requirements; and file an Intent to Graduate. Graduate certificates are not standalone programs and are only available to current students in applicable graduate programs. Thus, graduate certificates are conferred at the same time as the student's primary graduate program.

Program Requirements

- **Total Units Required: 15**
- **Certificate Length: Varies**
  - Students will be awarded the certificate at the time of completion of their PhD. Therefore, time to completion varies based on the length of their program.
  - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.

Required Courses

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 advisor, students may substitute equivalent courses or more demanding mathematical treatments of the same course material. Students must earn at B- or higher in each course for it to count toward the certificate. For programming prerequisites, visit our Quantitative Data Analysis website.

Core Area Courses

Students must choose at least one course from each area:

Probability and Statistics

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

Inference and Quantitative Research Design

Code	Title	Units
Educ 503	Foundations of Educational Research	3
Math 5110	Experimental Design	3
Pol Sci 5024	Causal Inference	3
Psych 5011	Research Designs and Methods	3

Focus Area Courses

Students must choose at least two courses from one of these three areas:

Longitudinal and Time-Series Data Analysis

Code	Title	Units
MEC 661	Analysis of Time Series Data	3
MSB 618	Survival Analysis	3
Pol Sci 584	Multilevel Models in Quantitative Research	3
Psych 5068	Hierarchical Linear Models	3
Psych 5165	Applied Longitudinal Data Analysis	3
Psych 5167	Applied Bayesian Statistics for Psychologists	3
SWDT 6600	Multilevel and Longitudinal Modeling	3
SWDT 6905	Propensity Score Analysis	3

Multivariate and Machine Learning Analysis

Code	Title	Units
CSE 514A	Data Mining	3
CSE 517A	Machine Learning	3
Math 5430	Multivariate Statistical Analysis	3
Math 535	Topics in Combinatorics	3
Psych 5012	Selected Topics in Design and Statistics	3
Psych 516	Applied Multivariate Analysis	3
SWDT 6901	Structural Equation Modeling	3

Data Mining and Specialized Research Tools

Code	Title	Units
CSE 514A	Data Mining	3
CSE 517A	Machine Learning	3
Econ 5161	Applied Econometrics	3
Math 5310	Bayesian Statistics	3
MSB 550	Introduction to Bioinformatics	3
Psych 5167	Applied Bayesian Statistics for Psychologists	3
SWCD 5082	Foundations of Geographic Information Systems (GIS) For The Applied Social Sciences	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.

Phone:	314-935-6520
Website:	https://psych.wustl.edu/graduate-program