

QUANTITATIVE SOCIAL SCIENCE

Overview

Quantitative Social Science (QSS) is a burgeoning interdisciplinary field that combines quantitative analysis skills with a variety of substantive social science disciplines. The Quantitative Social Science program provides students across the social sciences with the core skills and tools required to conduct sophisticated quantitatively-oriented social science research. Designed to accompany the substantive core courses of another social science area of concentration (AOC), this program of study emphasizes the mathematical foundations as well as practical methodological components of quantitative data analysis, including research design, applied statistics, and programming.

Quantitative Social Science is not just the study of how to do data analysis but also the study of why data analysis should be done, what its possibilities are and its limitations. Students who pursue a joint concentration or secondary field in QSS will emerge with a better understanding of how decisions with data get made, how to interpret the profusion of data in our increasingly digital society, how different social science fields utilize data to understand their areas of study, and how to communicate effectively and clearly with data.

The Quantitative Social Science program will be of particular interest to students hoping to pursue careers in state or federal government, media and communications, consulting, marketing and finance, and health and environmental organizations—all of which increasingly require data analysis skills. Additionally, this AOC may be helpful for those interested in graduate school in the social sciences, where sophisticated quantitative skills are increasingly expected as prerequisites for admission.

Faculty in Quantitative Social Science

Catherine Cottrell (<https://www.ncf.edu/directory/catherine-cottrell/>), Associate Professor of Psychology (On Leave)

Tarron Khemraj (<https://www.ncf.edu/directory/tarron-khemraj/>), Professor of Economics and International Economics/William and Marie Selby Chair

Jack Reilly (<https://www.ncf.edu/directory/jack-reilly/>), Associate Professor of Political Science (On Leave)

Sherry Yu (<https://www.ncf.edu/directory/sherry-x-yu/>), Associate Professor of Economics and Finance

Requirements for the Joint AOC in Quantitative Social Science

A minimum of nine (9) academic units.

Code **Title**

Level I Applied Statistics Course ¹

Select **one** of the following:

STAT 2100	Introduction to Applied Statistics*
POLS 2500	Quantitative Political Analysis I*
STAN 2700	Dealing with Data I*
STAT 2125	Statistics for Economics and the Social Sciences*

Level II Statistics or Applied Statistics Courses ²

Select **two** from the following examples:

PSYC 3700	Advanced Statistics for Psychology
ECON 4100	Econometrics
POLS 3550	Quantitative Political Analysis II
STAN 2800	Dealing with Data II
STAN 3350	Introduction to Categorical Data Analysis
STAN 3000	Statistical Learning

Introduction to Programming Course

CSCI 2200	Introduction to Programming in Python*
or CSCI 2550	Introduction to Programming in C

Computation Course

CSCI 4322	Databases for Data Science
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Social Science Research Design Course

Select **one** from the following examples:

PSYC 4550	Research Methods in Psychology
POLS 3500	Research Design Workshop in Political Science
SOCI 3100	Sociological Research Methods
ANTH 4600	Method and Theory in Archaeology*

Mathematics Course

INDV 2055	Mathematics for the Social Sciences ³
or MATH 2311	Calculus I*

Additional Quantitative Electives

Select **two** from the following examples:

GEON 2150	Introduction to GIS
ECON 3480	Introductory Econometrics and Big Data Applications
GEON 3130	GIS II
GEON 3150	GIS and Remote Sensing
POLS 3560	R for GIS and Political Geography
STAN 3230	Data Visualization and Communication
STAN 3000	Statistical Learning
MATH 2500 & MATH 3510	Probability I and Probability II*
MATH 2311	Calculus I*
MATH 2312	Calculus II*
MATH 2313	Calculus III
MATH 3105	Linear Algebra
MATH 3410	Mathematical Modeling
DATA 3120	Algorithms for Data Science

Quantitatively-Oriented Thesis or Independent Project

Typically this requirement is met through the completion of a quantitative-based thesis; a quantitative chapter in a thesis; a quantitative Independent Study Project (ISP); a quantitative Independent Research Project (IRP); or a quantitative-focused tutorial.

Additional Requirements

Language: R and Python must be utilized as the dominant language in at least one course each. This requirement can be supplemented with additional tutorials if necessary.

Distribution: Primarily quantitative coursework must be undertaken in at least two different social science fields: Psychology, Economics, Political Science, Sociology, Geography, Anthropology, and History. Primarily substantive courses in those fields cannot count for this distribution requirement.

¹ Level I refers to quantitative analysis or applied statistics courses with no prerequisites.

² Level II refers to quantitative analysis or applied statistics courses with statistical or quantitative prerequisites.

³ Students may also take Linear Algebra (MATH 3105) to satisfy this requirement.

Requirements for a Secondary Field in Quantitative Social Science

A minimum of seven (7) academic units.

Code	Title
Level I Applied Statistics Course ¹	
Select one of the following:	
STAT 2100	Introduction to Applied Statistics*
POLS 2500	Quantitative Political Analysis I*
STAN 2700	Dealing with Data I*
STAT 2125	Statistics for Economics and the Social Sciences*
Level II Statistics or Applied Statistics Courses ²	
Select two from the following examples:	
PSYC 3700	Advanced Statistics for Psychology
ECON 4100	Econometrics
POLS 3550	Quantitative Political Analysis II
STAN 2800	Dealing with Data II
STAN 3350	Introduction to Categorical Data Analysis
STAN 3000	Statistical Learning
Introduction to Programming Course	
CSCI 2200	Introduction to Programming in Python*
or CSCI 2550	Introduction to Programming in C
Social Science Research Design Course	
Select one from the following examples:	
PSYC 4550	Research Methods in Psychology
POLS 3500	Research Design Workshop in Political Science
SOCI 3100	Sociological Research Methods
ANTH 4600	Method and Theory in Archaeology*
Mathematics Course	
INDV 2055	Mathematics for the Social Sciences ³
or MATH 2311	Calculus I*
Additional Quantitative Elective	
Select one from the following examples:	
GEON 2150	Introduction to GIS
ECON 3480	Introductory Econometrics and Big Data Applications

GEON 3130	GIS II
GEON 3150	GIS and Remote Sensing
POLS 3560	R for GIS and Political Geography
STAN 3230	Data Visualization and Communication
STAN 3000	Statistical Learning
MATH 2500 & MATH 3510	Probability I and Probability II*
MATH 3105	Linear Algebra
MATH 3410	Mathematical Modeling
DATA 3120	Algorithms for Data Science

Additional Requirements

Language: R and Python must be utilized as the dominant language in at least one course each. This requirement can be supplemented with additional tutorials if necessary.

Distribution: Primarily quantitative coursework must be undertaken in at least two different social science fields: Psychology, Economics, Political Science, Sociology, Geography, Anthropology, and History. Primarily substantive courses in those fields cannot count for this distribution requirement, but up to two courses can double count toward a student's primary AOC.

¹ Level I refers to quantitative analysis or applied statistics courses with no prerequisites.

² Level II refers to quantitative analysis or applied statistics courses with statistical or quantitative prerequisites.

³ Students may also take Linear Algebra (MATH 3105) to satisfy this requirement.