

PH.D. POLITICAL METHODOLOGY COURSES, REQUIREMENTS, & SEQUENCE

(Adopted in February 2006; Starting AY 2006–2007)

Level 1: Basic Core Courses (Required of All 1st Year Students)

(Each course is three credit hours)

- **PS 2020: Empirical Methods of Research (aka Introduction to Research Design and Statistical Analysis).** *This course is offered every Fall semester.* This course is divided into two roughly equal sections covering topics relating to research design and basic measurement in one section, and elementary statistics (i.e., descriptive statistics, probability theory, and inferential statistics) in the remaining section. *There are no prerequisites for this course.*
- **PS 2030: Political Research and Analysis (aka Intermediate Statistics for Political Science).** *This course is offered every Spring semester.* This course primarily covers regression analysis (general linear model, its assumptions, its violations, and how to address them), and also addresses statistical issues involving the measurement of political phenomena. *The prerequisite for this course is PS 2020.*

Level 1.5: Short Course on Basic Mathematics for Political Scientists

(A Prerequisite for Ph.D. Students Taking Advanced Quantitative Methods Courses)

- ▶ **PS 2000: Short Course: Mathematics for Political Scientists.** *This course is offered every year in the week prior to the beginning of Fall semester classes.* This course is a 25 hour one week course (two [morning & afternoon sessions] – two 3 hour class sessions per day for 4 days: Monday–Thursday). Topics include probability theory, differential and integral calculus, constrained optimization techniques, and matrix algebra. Although students will acquire the instructor’s course notes, students will not have any graded assignments. *There are no prerequisites for this course. This course will be graded on a Pass/Fail basis based solely upon both attendance and participation.*

Note: PS 2000 can be taken prior to a student’s 2nd year in all instances, except for those students entering the graduate program in Odd years who wish to take game theory in the Spring of their 1st year of course work who will need to take it prior to their 1st year in the graduate program. Please consult with both the graduate director and major faculty advisor(s) to determine if (and when) this course should be taken as part of your program of study.

Level 2: Advanced Core Courses: (Electives or Fulfillment as a 2nd or 3rd Field)
(Each course is three credit hours)

- **PS 2703: Game Theory:** *This course is offered on biennial basis every Spring semester in “Even” numbered years. This course covers the application of strategic bargaining to the study of political phenomena. Topics include, but not limited to, Nash equilibria, games of complete and incomplete information, signaling games, Bayesian and sequential games. The prerequisites for this course are PS 2000 and PS 2020.*
- **PS 2720: Longitudinal Models and Causal Analysis:** *This course is offered on biennial basis every Fall semester in “Odd” numbered years This course covers various topics relating to hierarchical linear (random coefficient) models, latent growth curve analysis, causal analysis, structural equation modeling for survey data; and an introduction to panel data models. The prerequisites for this course are PS 2000 and PS 2030.*
- **PS 2730: Maximum Likelihood/Limited Dependent Variable Models:** *This course is offered on biennial basis every Fall semester in “Even” numbered years. This course introduces students to a theory of maximum likelihood inference. Topics include discrete choice regression models (i.e., Logit, Probit ; Ordinal Logit & Probit; Multinomial Logit and Probit); event count regression models (i.e., Poisson, Negative Binomial); sample selection and truncation (i.e., Heckit and Tobit models); event history analysis; and duration /survival models. The prerequisites for this course are PS 2000 and PS 2030.*
- **PS 2740: Time Series Analysis:** *This course is offered on biennial basis every Spring semester in “Even” numbered years. This course introduces students to the statistical analysis of time series data in political science. Topics include, theory of first–order linear difference equations, distinguishing between structural and reduced–form equations, ARIMA models, unit roots, cointegration, single and multiple equation error correction models, vector autoregression, autoregressive distributed lag models, ARCH conditional variance modeling, and various techniques for pooled time series cross–sectional data models containing continuous dependent variables. The prerequisites for this course are PS 2000 and PS 2030.*
- **PS 2750's: Advanced Quantitative Methods Special Topics Module.** *These courses will be offered on an irregular and/or infrequent basis depending upon both faculty interests and student demand. Each course will account for 1.5 credit hours in the module format. The prerequisites for this course are PS 2000 and PS 2030.*

Students taking Quantitative Methods as either a 2nd or 3rd field of study in their doctoral program must take one of the following course work options:

- **Option 1: successfully complete a minimum of three (3) advanced quantitative methods core courses among PS 2703, PS 2720, PS 2730, and PS 2740;**

or

- **Option 2: successfully complete a minimum of two (2) advanced quantitative methods core courses among PS 2703, PS 2720, PS 2730, and PS 2740, plus successfully complete two (2) advanced quantitative methods special topics module courses (PS 2750's) within the political science department approved by both the Director of Graduate Studies and Advanced Quantitative Methods Core Faculty;**

or

- **Option 3: successfully complete a minimum of two (2) advanced quantitative methods core courses among PS 2703, PS 2720, PS 2730, and PS 2740, plus successfully complete one (1) advanced quantitative methods course taken outside the political science department at either the University of Pittsburgh or Carnegie Mellon University (e.g., Economics, Statistics, Psychology) approved by both the Director of Graduate Studies and Advanced Quantitative Methods Core Faculty.**

Students taking Quantitative Methods as a 2nd field of study must also pass a comprehensive examination in advanced quantitative methods based upon their relevant course work. Although participation in the Inter–University Consortium for Political Science Research (ICPSR) is strongly encouraged for students interested in quantitative research, courses taken at ICPSR cannot be utilized as substitutes for advanced coursework for students taking Political Methodology as either a 2nd or 3rd field in their program of study.

**HYPOTHETICAL QUANTITATIVE METHODS COURSE SEQUENCE FOR PH.D. STUDENTS
(Ph.D. Students Arriving in “Even” Years – e.g., 2006–2007)**

PRIOR to Fall Semester (Year 1 or Year 2): Prerequisite for Advanced Courses

- PS 2000: Short Course: Mathematics for Political Scientists

Fall Semester (Year 1)

- PS 2020: Empirical Methods of Research

Spring Semester (Year 1)

- PS 2030: Political Research and Analysis

Fall Semester (Year 2)

- PS 2720: Longitudinal Models and Causal Analysis

Spring Semester (Year 2)

- PS 2703: Game Theory
- PS 2740: Time Series Analysis

Fall Semester (Year 3)

- PS 2720: Maximum Likelihood/Limited Dependent Variable Models

Spring Semester (Year 3)

- Not Applicable

Note: Advanced special topics module courses can be taken anytime during the 2nd or 3rd year of study.

**HYPOTHETICAL QUANTITATIVE METHODS COURSE SEQUENCE FOR PH.D. STUDENTS
(Ph.D. Students Arriving in “Odd” Years – e.g., 2007–2008)**

PRIOR to Fall Semester (Year 1 or Year 2): Prerequisite for Advanced Courses

- PS 2000: Short Course: Mathematics for Political Scientists

Fall Semester (Year 1)

- PS 2020: Empirical Methods of Research

Spring Semester (Year 1)

- PS 2030: Political Research and Analysis
- PS 2703: Game Theory

Fall Semester (Year 2)

- PS 2730: Maximum Likelihood/Limited Dependent Variable Models

Spring Semester (Year 2)

- Not Applicable

Fall Semester (Year 3)

- PS 2720: Longitudinal Models and Causal Analysis

Spring Semester (Year 3)

- PS 2740: Time Series Analysis

Note: Advanced special topics module courses can be taken anytime during the 2nd or 3rd year of study.