Advanced Methods Course Expectations
Updated May 5, 2022

Applied Multivariate Methods (prereq: Basic Quantitative Methods)
Students should already have a strong command of:

- univariate statistics (measures of central tendency, measures of dispersion);
- probability and the standard normal distribution;
- principles of inferential statistics (Central Limit Theorem, standard error, p values, alpha, confidence intervals);
- bivariate statistics (*t* tests, one-way analysis of variance, chi square, correlation);
- research methods, including study design, the principles of hypothesis testing;

Students are strongly encouraged to enter the class with some experience programming in a statistical package, Stata, SAS, R, or SPSS.

Discrete Methods (prereq: Basic Quantitative Methods)
Students should already have theoretical and practical knowledge of multiple regression and be familiar with how to conduct basic statistical analyses using a statistical software package like Stata. Specifically, I assume that the student has a sound understanding of basic inferential procedures and sampling distributions, and can conduct hypothesis testing for means, proportions (t-test, ANOVA, Chi-square) and regression coefficients. Since I take students through all of this in my section of BQM, students can take Discrete after finishing BQM. After completing the course students should have a sufficient level of statistical comfort in analyzing categorical data using Stata, interpreting the findings meaningfully for a lay audience, and writing a journal length paper that is of publishable quality.

Data Analytics (prereq: Discrete Methods or Applied Multivariate Methods)
Students should be already very comfortable with multivariate linear regression and a set of advanced statistical techniques such as those taught in Discrete Choice and Applied Multivariate Analysis. These additional capabilities are not required but are helpful: being proficient with a statistical package such as SPSS, Stata or SAS, computer programming experience, and experience using large, messy data sets. Students who have completed either Discrete Choice or Applied Multivariate Analysis and are comfortable with that type of material and level of numerical proficiency should do fine in Data Analytics.

Program Evaluation (prereq: Basic Quantitative Methods; Discrete Methods or Applied Multivariate Methods)
Students should already have theoretical and practical knowledge of multiple regression and be familiar with how to conduct basic statistical analyses using a statistical software package like Stata. Specifically, I assume that the student has a sound understanding of basic inferential procedures and sampling distributions, and can conduct hypothesis testing for means, proportions (t-test, ANOVA, Chi-square) and regression coefficients. The student will gain more from the course if he/she has taken the more advanced statistical methods (non-linear models) taught in Discrete and/or Applied Multivariate Methods. After completing the course, the student should be able to use an appropriate evaluation design and statistical/econometric techniques to empirically study the effectiveness of policies/programs. Students will also gain experience in conducting their own policy/program evaluation and writing a journal length paper that is of publishable quality.