QUANTITATIVE METHODS for Economics of Public Policy

Total: 50 hours

		No. of Hours
I.	**Introduction to Quantitative Methods for Public Policy** • Introducing QM to help evaluate policy • Importance of collecting good data Reading: Wooldridge, Chapter 1	1
II.	**Introduction to Stata or R** • Reading in data • Basic commands • Useful functions • Introduction to Econometrics by Simulation (http://www.econometricsbysimulation.com)	2
III.	**Quantitative Methods in Social Science, Descriptive Statistics** *Reading:* Whelan, pp. 1-57	2
IV.	**Basic Probability; Problems with Probability; Importance of Data and Central Limit Theorem** *Reading:* Wheelan, pp. 68-109; 110-142	3
V.	**Hypothesis Testing & the t-Test; ANOVA, Chi-Square, and Correlation** *Reading:* Wheelan pp. 58-67; 143-168	5
VI.	**Introduction to Regression Analysis** • Population Regression Function and Sample Regression Function • Ordinary Least Squares • Deriving OLS coefficients – Simple regression • Interpretation of regression coefficients • Using Stata or R to estimate simple regression *Reading:* Wooldridge: Chapter 2 Cunningham, pp. 35-66	5
VII	**Regression Analysis (continued)** • Properties of OLS Estimators • Assumptions of CLRM • Goodness of Fit • Units of Measurement and size of coefficients • Functional Form: Linear, semi-log, double-log • Variance of OLS estimators • Error Variance • Using Stata or R to evaluate an estimated Regression equation *Reading:* Wooldridge: Chapter 2 Cunningham, pp. 35-66	5
VIII	**Regression Analysis: Inference** • Statistical Inference • Specifications Tests: t-statistics • Test of Goodness of Fit: F-test • Using Stata or R for Statistical Inference *Reading:* Wooldridge: Chapter 4 Cunningham, pp. 35-66	5

IX	**Violation of Assumptions** • Departures from the classical assumptions • Heteroscedasticity • Consequences, Detection, Remedies • Stata or R commands for testing heteroscedasticity *Reading:* Wooldridge: Chapter 8 Cunningham, pp. 35-66	3
X	**Multiple Regression Analysis** • Interpreting Multiple Regression coefficients • Goodness of Fit: R-squared and Adjusted R-squared • Exclusion restrictions • Omitted variable bias • Inclusion of irrelevant variable(s) • Dummy variables: Slope and intercept dummies • Multicollinearity • Using Stata or R to estimate multiple regression models *Reading:* Wooldridge: Chapters 3, 4, 5, 6, 7 Cunningham, pp. 35-66	5
XI	**Regression analysis using Time-Series data** • Danger of spurious regression • Elementary ideas of unit roots and stationarity • Problem of Autocorrelation • Detection of autocorrelation: Durbin-Watson test • Correction for Autocorrelation *Reading:* Wooldridge: Chapters 10, 11	4
XII	**Causal Inference Using Observational Data** • Potential Outcomes Causal Model • Introduction to Instrument Variables; Regression Discontinuity and Difference in Difference *Reading:* Cunningham: pp. 81 – 104 Hal Varian (2016), Causal inference in Economics and Marketing Angrist and Pischke, Mastering 'Metrics, ch. 1	10

References:

Angrist J. and J. Pischke (2015): Mastering Metrics: The Path from Cause to Effect, Princeton University Press, Princeton

Cunningham: Causal Inference: The mix tape (v. 1.7) (2018), Published by TUFTE LATEX.Googlecode.com http://scunning.com/cunningham_mixtape.pdf

Varian H. (2016): Causal inference in Economics and Marketing, Proceedings of the National Academy of Sciences, 113(27):7310-7315 http://www.pnas.org/content/113/27/7310.full

Wheelan Charles (2014): Naked Statistics: Stripping the Dread from the Data, W.W. Norton, New York.

Wooldridge, J. M. (2006) Introductory Econometrics – A Modern Approach, Thomson South-Western, Delhi, 3rd Edition (ISBN: 81-315-0322-4)