Course title: Methodologies I: Statistical Analysis			
Course code: PPS 171	**No. of credits:** 2	**L-T-P:** 22-3-6	**Learning hours:** 42
Pre-requisite course code and title (if any): NA			
Faculty: Faculty of Policy and Planning		**Department:** Department of Policy Studies	
Course coordinator: L N Venkataraman		**Course instructor:** L N Venkataraman	
Contact details: venkataraman.ln@teriuniversity.ac.in			
Course type: Core		**Course offered in:** Semester 1	

Course description:

The course introduces students to statistical concepts and techniques essential to the analysis of public policy issues. The course will provide an introduction to statistics and regression based methods for quantitative evaluation of causal effectiveness of public policies. The objective of the course is for students to learn how to conduct (and how to critique) empirical studies in quantitative policy analysis and in social sciences more generally. Accordingly, the emphasis of the course is on empirical applications. Empirical problems will largely focus on different survey rounds of NSSO data. The course also provides students an opportunity to become proficient in the use of STATA widely used in analyzing quantitative data.

Course objectives:

- To learn how to conduct (and how to critique) empirical studies in quantitative policy analysis and in social sciences more generally.

Course contents

Module	Topic	L	T	P
1.	**Basic Statistics and Causal Inference** 1.1 Discrete and Continuous Random variables 1.2 Probability Distribution Functions 1.3 Estimation (Point Estimates and their properties) 1.4 Hypothesis Testing (testing hypotheses about a single population parameter (one and two sided alternatives); confidence intervals; testing hypotheses about a single linear combination of parameters; testing multiple linear restrictions.) 1.5 Nature of Socio-Economic Data and Tools for Data Analysis (Descriptive Statistics, Quintile-decile plots, Correlation, Analysis of Variance (ANOVA)). 1.6 Need for Empirical Analysis and Causality	16	2	4
2.	**Linear Regression** 2.1 Introduction to Ordinary Least Squares 2.2 Violation of OLS assumptions	6	1	2
	Total	**22**	**3**	**6**

Evaluation criteria:

Project : 50%
Major exam : 50 %

Learning outcomes :

- Able to understand and interpret empirical results relevant for policy making
- To become proficient in the use of software like STATA

Pedagogical approach

Concepts in basic statistics will be motivated with reference to real world policy situation and through practical problems.

Students will be encouraged to bring data sets in the class and rigorously discuss problems of interest in their particular field of interest. Mathematical proofs will be discussed in tutorials, if there is interest.

Materials

Textbooks

Hogg, Robert V., Joseph W. McKean, and Allen Thornton Craig (2013). Introduction to mathematical statistics. 7th ed. Boston: Pearson.
Das, R. K., and Nagar A. L. Basic statistics. 2nd ed. Oxford, 1985.

Suggested Readings

Angrist, J.D., and Pischke, J. (2009). Mostly harmless econometrics: An empiricist's companion. Princeton: Princeton University Press.

Additional information (if any)

Student responsibilities
Students are expected to come prepared for class, having done the required reading and be able to participate in class discussions.

Course reviewers

Dr. Prodipto Ghosh, Distinguished Fellow, TERI, New Delhi.

Dr. Subir Sen, Department of Humanities and Social Sciences, IIT Roorkie.