

## 5 week Winter School on Econometrics for Policy with Neeraj Hatekar

1. Concepts in Econometrics  
Probability distributions and hypothesis testing ( 08 hours)  
Random variables-mathematical expectations-law of large numbers-probability distributions-hypothesis testing: types of errors, p values, parametric and non-parametric tests – introduction to R
2. Regression Analysis ( 8 hours)  
OLS and GLS: Assumptions of the normal linear model-estimation and inference in simple linear regression model-extension to multiple linear regression model - unbiasedness – efficiency-tests of assumptions- GLS and F GLS-implementation in R
3. Basic Issues in programme evaluation : Causality and selection Bias ( 2.5 hours)  
Regression and causality – endogeneity, errors in variables and omitted variable bias- selection bias and implications for regression models, implementation in R
4. Instrumental Variables ( 2.5 hours)  
Instrumental variables and endogeneity-instrumental variable estimators- Two stage least squares-identification issues – efficiency of instrumental variables –implementation in R
5. Binary Choice Models ( 5 hours)  
Binary Choice problems-Logistic regression-properties and interpretation- testing- logistic regression and machine learning- implementation in R
6. Propensity score matching ( 2.5 hours)  
Policy evaluation and propensity score models- estimation and inference- implementation in R
7. Panel Data Fixed and random effects models ( 5 hours)  
Advantages of Panel data – within and between estimators- fixed effects model-LSDV model- random effects model- Hausman specification test- implementation in R
8. Difference in Difference estimators ( 2.5 hours)  
Policy evaluation and D-I-D estimators-estimation and inference- implantation in R

Evaluation:

There will be take home assignments after every class. Students will be taught R along with the regular lectures.

Learning Outcomes:

1. Understand the basic building blocks of modern econometrics
2. Understand how to evaluate policy using econometric tools
3. Learn to use the programming language R for econometric models