

DEPARTMENT OF ECONOMCS  
UNIVERSITY OF DELHI

Subject: Common Pool of DSE  
Sem.: VI  
Course & Code: Introduction to Causal Inference ECON056  
Duration (per week): 5 (3 Lectures + 2 Tutorial)  
Date & Time 26/11/2024 at 02:30 PM  
Venue: 104, Department of Economics, Delhi University  
Convenor: Reetika Garg

Present:

Shikha Singh	Daulat Ram College
Benston John	St. Stephen's College

### **Learning Objectives**

The Learning Objectives of this course are as follows:

- This course intends to provide students with the essential econometric tools required for causal inference analysis.
- The course will give an overview about potential outcomes framework, data design and analysis.

### **Learning outcomes**

The Learning Outcomes of this course are as follows:

- The students will be able to understand, design and implement various techniques of causal inference for data analysis as a tool for research.
- The students will be able to do an independent research project based on the techniques they will earn in this course.

### **Agenda of the Meeting**

- To discuss detailed Topic-wise / Unit-wise Reading list
- To discuss Evaluation criteria and Exam pattern

## Syllabus

### UNIT I: Potential Outcomes Framework (9 hours)

#### Causal Inference and Potential Outcomes Framework

- Imbens and Rubin Chapter 1 Section 1.1 to 1.10
- Cunningham Chapter 1 (Introduction) Chapter 3 (Directed Acyclic Graphs) Chapter 4 (Potential Outcomes Causal Model)

### UNIT II: Research Design (9 hours)

#### Observational data and experimental data; sample selection

- Huntington Chapter 1, 2, 3, 4 and 10
- Angrist, & Pischke Chapter 2

### UNIT III: Methods of Analysis (9 hours)

#### Overview: Ordinary Least Squares (OLS) and Limited Dependent Variables (LDV) Models, Instrumental Variables

- Huntington Chapter 13 (excluding sections 13.1.6, 13.2.6, 13.4.1 and 13.4.4 ) and 19\* (till 19.3.2, discussion of GMM to be excluded)
- Cameron and Trivedi Chapter 14 (excluding section 14.7)
- Cunningham Chapter 7 (Instrument Variables)

### UNIT IV: Panel Data (including Difference-in-Difference) (9 hours)

#### Regression Discontinuity Design (RDD); Introduction to Matching

- Cunningham Chapter 5 (Matching and Subclassification), 6 (Regression Discontinuity), 8 (Panel Data) and 9 (Difference in Difference)
- Huntington Chapter 14\*, 18\* and 20\*

### UNIT V: Hands-on Training (9 hours)

#### Project work using econometric software (EViews/ R/Stata/EXCEL/SPSS/Julia)

- Application of techniques covered in Unit I to IV using econometric softwares available in the college.

**Note: The readings / chapters that are star marked (\*) above are optional**

### **Readings**

1. Huntington-Klein, N. (2021). The effect: An introduction to research design and causality. Chapman andHall/CRC.
2. Cunningham, S. (2018). Causal inference: The mixtape
3. Angrist, J. D., & Pischke, J. S. (2014). Mostly Harmless Econometrics, Princeton University Press.
4. Imbens, G. W., & Rubin, D. B. (2015). Causal inference in statistics, social, and biomedical sciences. Cambridge University Press.
5. Cameron, A.C. & Trivedi, P.K (2005) Microeconometrics: Methods and Applications Cambridge University Press

### **Evaluation & Assessment**

Internal Assessment (IA): 30 marks

- As per the University guidelines

Continuous Assessment (CA): 40 marks

- As per the University guidelines

End Semester (Final) Exam: 90 marks

- It was decided that for the End Semester examination one compulsory question of 18 marks will be from Unit I and II.
- From Unit III and IV there will be open choice of attempting 4 out of 5 questions (18 marks each)
- No question will be asked Unit V in the end- semester exam; however Unit V will be evaluated under the continuous assessment criteria.