

Discipline Specific Elective 26 (DSE-26): Introduction to Causal Inference

Semester	Course title & Code	Credits	Duration (per week)			Eligibility Criteria	Prerequisite
			Lecture	Tutorial	Practical/ Practice		
VI/VIII	Introduction to Causal Inference– ECON056	4	3	2	0	Class 12 th Pass	Basic Econometrics (ECON024)

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 learn in this course.

Syllabus

UNIT I: Potential Outcomes Framework (9 hours)

Causal Inference and Potential Outcomes Framework

UNIT II: Research Design (9 hours)

Observational data and experimental data; sample selection

UNIT III: Methods of Analysis (9 hours)

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

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

Regression Discontinuity Design (RDD); Introduction to Matching

UNIT V: Hands-on Training (9 hours)

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

Recommended readings

- Huntington-Klein, N. (2021). The effect: An introduction to research design and causality. Chapman and Hall/CRC.
- Imbens, G. W., & Rubin, D. B. (2015). Causal inference in statistics, social, and biomedical sciences. Cambridge University Press.
- Stock, J. H., & Watson, M. W. (2015). Introduction to econometrics (3rd updated edition).
- Rosenbaum, P. (2018). Observation and experiment. Harvard University Press.

- Angrist, J. D., & Pischke, J. S. (2014). *Mastering metrics: The path from cause to effect*. Princeton university press.
- Imai, K. (2018). *Quantitative social science: An introduction*. Princeton University Press.
- Cunningham, S. (2018). *Causal inference: The mixtape (V. 1.7)*
- Gertler, Paul J.; Martinez, Sebastian; Premand, Patrick; Rawlings, Laura B.; Vermeersch, Christel M. J.. (2016). *Impact Evaluation in Practice, Second Edition*. Washington, DC: Inter-American Development Bank and World Bank.
- White, H., Raitzer, D. A. (2017). *Impact Evaluation of Development Interventions: A Practical Guide*. Philippines: Asian Development Bank.
- Glewwe, P., & Todd, P. (2022). *Impact Evaluation in International Development*.
- Carolina Arteaga, The effect of human capital on earnings: Evidence from a reform at Colombia's top university, *Journal of Public Economics*, Volume 157, 2018, 212- 225
- Bertrand, M., & Mullainathan, S. (2004). Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *American Economic Review*, 94(4), 991-1013.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.