

Causal Inference with Observational Data

Course title – Intitulé du cours	Causal inference with observational data
Level / Semester – Niveau /semestre	M2-S1
School – Composante	Ecole d'Economie de Toulouse
Teacher – Enseignant responsable	Matteo Bobba and Augustin Tapsoba
Other teacher(s) – Autre(s) enseignant(s)	
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Other teacher(s) – Autre(s) enseignant(s)	
Lecture Hours – Volume Horaire CM	30
TA Hours – Volume horaire TD	15
TP Hours – Volume horaire TP	
Course Language – Langue du cours	English
TA and/or TP Language – Langue des TD et/ou TP	English

Teaching staff contacts – Coordonnées de l'équipe pédagogique :

- Matteo Bobba (MB): matteo.bobba@tse-fr.eu - T352
- Augustin Tapsoba (AT): augustin.tapsoba@tse-fr.eu - T354

Course Objectives – Objectifs du cours :

This course introduces students to the main research designs that can recover causal effects using observational data. It will cover the key assumptions behind each approach, how and when to implement each of them and what are their limitations. TA sessions will allow students to practice and test some of the theoretical properties of these methods with data.

Prerequisites – Pré requis :

Students should be familiar with the content of the compulsory M1 econometrics courses. Basic knowledge of programming with any of the popular software languages (Stata or R) is recommended. Students will have the opportunity to enhance their programming skills with the TA/TP sessions.

Practical information about the sessions – Modalités pratiques de gestion du cours :

Student should participate actively to each session. Laptops and tablets are tolerated if used for the sole purpose of following the course.

Grading system – Modalités d'évaluation :

Written Exams (mid-term and final) – Home assignments (problem sets)

Bibliography/references – Bibliographie/références :

This course will mainly follow the textbook "Causal Inference: The Mixtape" by Scott (2020) for both the lectures and the TA sessions.

- Cunningham, Scott. Causal Inference: The Mixtape. Yale University Press, 2021.

Two complementary references are:

- Hansen Bruce, E. "Econometrics" Wisconsin: University of Wisconsin (2020).
- Angrist, Joshua D., and Jorn-Steffen Pischke. "Mostly harmless econometrics: An empiricist's companion". Princeton university press, 2008.

Session planning – Planification des séances

Part 1 : By Augustin Tapsoba

- Probability and Regression Review
- Directed Acyclic Graphs
- Potential Outcomes Causal Model
- Difference-in-Differences

Part 2 : By Matteo Bobba

- Instrumental Variables
- Regression Discontinuity
- Matching and subclassification
- Synthetic Control
- Panel Data

Distance learning – Enseignement à distance :

Distance learning can be provided when necessary by implementing:

- *Interactive virtual classrooms*
- *MCQ tests and other online exercises / assignments*
- *Remote (online) tutorials (classes)*