

# Course Outline

## Quantitative Methods for Development

McGill University

### General Information

Course #	INTD 356
Term	Fall
Year	2021
Number of credits	3
Course schedule (day and time of class)	Monday and Wednesday 4:05 pm { 5:25 pm
Room	W215 { Arts Building

### Instructor Information

Name and Title:	Fabien Forge, Ph.D. (he/him)
Email:	fabien.forge@mcgill.ca
Virtual office hours:	Mondays, 1pm { 3pm
Communication plan:	Online using Zoom during office hours, by email or by appointment Please consider emailing your TA first.

### TA Information

Name:	Adam Aberra
Email:	adam.aberra@mail.mcgill.ca
Virtual office hours:	Thursdays, 9am { 10am

### Course Overview

This course is designed to introduce students to impact evaluation. Can we improve vaccination in India with small nudges? Is pollution harmful in China? Does it matter to belong to the ethnic group of an elected official when it comes to employment? Does it really matter to have an extra year of schooling for income years later? If yes, what is the magnitude of these effects? How much should you trust these results? The answer to these questions determines public policy and inform debates about development issues.

### Learning Outcomes

By the end of this course, students will be familiar with the main research designs used for impact evaluation. This includes the understanding of the statistical tools used, the ability to replicate research papers or perform their own analysis using R and interpret the results.

### Instructional Method

**Structure** { The course is divided in 2 parts. Classes 1 through 10 are designed to introduce students to the fundamentals of statistics and causal inference. In the second part, we will study different research designs and learn about how they work and when one should use them.

**Book** { There is no required textbook for this course. Information provided during lectures and in the slides will be sufficient to write the exams. I will be providing students with several sets of practice questions during the course, and will not use exercises from any textbook.

For those students who would like to refer to a textbook during this course you have several possibilities:

- Stock, James H. and Mark W. Watson (2019). Introduction to Econometrics, 3<sup>rd</sup> or 4<sup>th</sup> edition, Pearson Education. { The content of the book is closest to what is taught in class
- Hanck, Christoph, Martin Arnold, Alexander Gerber, and Martin Schmelzer. "Introduction to Econometrics with R." University of Duisburg-Essen (2019). { is a free book available [online](#) which follows closely Stock and Watson (2015) and adds examples in R.

^ Cunningham, Scott. "Causal Inference. The Mixtape 1", Yale University Press (2020) is also freely available [online](#) or you can buy the [book](#). While more advanced than what is required it also contains multiple examples in R.

Software { Many illustrations of mathematical concepts seen in class and regression analysis will use the [R language](#)! Students are encouraged to [install R](#) then [RStudio](#) as early as possible. Instructions can be found [here](#). Note that R and RStudio are free. You should not pay for any of this. Feel free to contact me if you have particular needs.

### Expectations for Student Participation

Each class will be highly interactive, and students will be expected to participate in class discussions by making comments or asking questions.

### Course Content

Date	Class	Description	Bibliography
01 Sep, Wed	1	Objective of the course	<a href="#">Watch</a> Du o (2010); Stock and Watson (2015) 1.1, 1.2, 4.1
06 Sep, Mon		Labour Day	
08 Sep, Wed	2	Intro to Probability and Statistics	Hanck et al. (2019) <a href="#">2</a> and <a href="#">3</a> , Cunningham (2021) <a href="#">2.7 to 2.12</a>
13 Sep, Mon	3		

27 Oct, Wed	15	Panel Data Analysis { Application	Miguel (2005); Burgess et al. (2017)
01 Nov, Mon	16	Instrumental Variable (IV) { Theory	Stock and Watson (2015) 12.1; Hanck et al. (2019) <a href="#">12.1</a> ; Cunningham (2021) <a href="#">7</a>
03 Nov, Wed	17	IV { Application	Heyes and Zhu (2019)
08 Nov, Mon	18	Difference-in-Difference (DiD) { Theory	Stock and Watson (2015) 13.4; Hanck et al. (2019) <a href="#">13.4</a>
10 Nov, Wed	19	DiD { Application	Du o (2001)
15 Nov, Mon	20	Midterm 2	
17 Nov, Wed	21	Regression discontinuity design (RDD){ Theory	Stock and Watson (2015) 13.4; Hanck et al. (2019) <a href="#">13.4</a> ; Cunningham (2021) <a href="#">9</a>
22 Nov, Mon	22	RDD { Application	Amodio et al. (2019) ( <a href="#">link</a> )
24 Nov, Wed	23	Matching and Synthetic Control Methods - Theory	Cunningham (2021) <a href="#">9</a> ; Robbins and Davenport (2018) ( <a href="#">link</a> )
29 Nov, Mon	24	Matching and Synthetic Control Methods { Application	Becerril and Abdulai (2010)
01 Dec, Wed	25	Model specification and goodness of fit	Stock and Watson (2015) 4.3, 6.4 and 7.5; Hanck et al. (2019) <a href="#">4.3</a>
06 Dec, Mon	26		

Absence to midterms and/or the final exam:

L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le [guide pour l'honnêteté académique](#) de McGill).

#### **Additional Statements**

The [University Student Assessment Policy](#) exists to ensure fair and equitable academic assessment for all students and to protect students from excessive workloads. All students and instructors are encouraged to review this Policy, which addresses multiple aspects and methods of student assessment, e.g. the timing of evaluation