

Intermediate Econometrics

Course title - Intitulé du cours	Intermediate Econometrics
Level / Semester - Niveau /semestre	M1 / Semestre 1
School - Composante	TSE
Teacher - Enseignant responsable	KOEN JOCHMANS – PASCAL LAVERGNE – FRANCOIS POINAS
Other teacher(s) - Autre(s) enseignant(s)	HYPPOLYTE BOUCHER – TIM EDERER – GOKCE GOKKOCA – PETER NEIS
Lecture Hours - Volume Horaire CM	30 (20 hours in class)
TD Hours - Volume horaire TD	10,5
TP Hours - Volume horaire TP	10,5
Course Language - Langue du cours	Anglais / Francais
TA and/or TP Language - Langue des TD et/ou TP	Anglais

Teaching staff contacts - Coordonnées de l'équipe pédagogique :

Lecturers:

Koen Jochmans, T 528, koen.jochmans@tse-fr.eu, office hours by appointment booked on the online agenda: <https://koenjochmans.appointy.com>

Pascal Lavergne, T 506, pascal.lavergne@ut-capitole.fr, office hours by appointment at <https://atlnyc-free.10to8.com>

Francois Poinas, T 509, francois.poinas@tse-fr.eu, office hours by appointment booked on the online agenda: <https://francoispoinas.appointy.com>

Teaching Assistants:

Hyppolyte Boucher, Tim Ederer, Gokce Gokkoca, Peter Neis

Course's Objectives - Objectifs du cours :

This is an intermediate econometrics course, which builds on the introductory econometrics course (L3) and is a prerequisite for applied econometrics and program evaluation courses (M1), as well as the econometrics courses in later years. We will study the main econometric methods used in applied economics. The methods are further studied and illustrated with economic applications in tutorials and hands-on applied exercises in the lab with R. The course reviews Ordinary (OLS) and Generalized Least Squares (GLS), and studies Instrumental Variables (IV) Methods, Nonlinear Least Squares (NLS), Maximum Likelihood Estimation (MLE) and Generalized Method of Moments (GMM), focusing on their proper use and asymptotic properties. At the end of the course, students should be able to use the

suitable methods depending on the context, should know their main properties and be able to establish them, and should know how to interpret the results in practice.

Prerequisites - Pré requis :

Prerequisites are Inferential Statistics (L2) and Introductory Econometrics (L3).

Here are the main concepts students should be familiar with:

Probability: random variables and vectors, probability distribution (joint, marginal, conditional) and density, quantiles, moments (expectation, variance, standard deviation,...), conditional expectation and variance, normal vectors and related distributions (Chi-square, Student, Fisher). Those concepts are presented in Greene (2011), Appendix B.

Inferential Statistics: random sampling, empirical moments (mean, variance,...) and quantiles, modes of Convergence (weak, quadratic mean, in law), estimator, unbiasedness, efficiency, law of large numbers, central limit theorem, confidence interval, hypothesis testing. Those concepts are presented in Greene (2011), Appendix C.

Econometrics: Simple and multiple linear regressions, least squares (estimation, finite sample properties), confidence intervals, tests, interpretation of parameter estimates (continuous and discrete explanatory variables, models with the dependent and/or explanatory variables in log), heteroskedasticity. Those concepts are covered in Stock, Watson (2014), chapters 4 to 7 or Wooldridge (2015), chapters 1 to 8.

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

The course will be composed of six chapters. For each chapter, the learning material will be posted on Moodle. The material will be made of detailed lecture notes, auto-assessment quizzes, exercises and practical problems.

Students have to work the material in autonomy.

Lectures, tutorials and lab sessions will consist in discussing the corresponding material by answering questions raised by the students and focusing on some of the main points. Working on the material before and after classes is essential to succeed in the course.

- Before the lectures, students are expected to work on the lecture notes (the sections corresponding to the lectures are indicated on the moodle webpage). They are also expected to assess their knowledge by solving the small exercises contained in the lecture notes and answering the online quizzes.
- Before tutorial and lab sessions, students are expected to try to solve the exercises corresponding to each class. Not being able to solve some questions is perfectly normal, but not giving a try will reduce the benefit of classes.
- Additional exercises will be made available to complement the ones covered in class. Students are expected to solve these exercises to assess their knowledge and practice for the exams. Solutions are provided. Advanced exercises (to go deeper) are also provided for students who want to go deeper on the course content. Students are not expected to be able to solve these exercises for the exam.

Posting questions on the forum (on moodle) is strongly encouraged.

All classes will take place on site.

Students are expected to check the course webpage regularly for updates and information. Usage of laptops and tablets during classes is allowed, provided they are used for the class only.

Grading system - Modalités d'évaluation :

Grading policy:- Homeworks: 20% - Midterm: 30% - Final exam: 50%.

The homeworks can be done individually or in pairs. We will not tolerate exact copies or late submissions.

Bibliography/references - Bibliographie/références :

Detailed lecture notes will be given all along the class. The following references may be useful to complement the content of the lecture notes:

- Greene, W., 2011, "Econometric Analysis", 7th edition, Pearson Education.
- Hayashi, F., 2000, "Econometrics," Princeton University Press.
- Ruud, P., 2000, "An Introduction to Classical Econometric Theory", Oxford University Press.
- Stock, J., Watson, M., 2014, "Introduction to Econometrics", 3rd edition, Pearson Education.
- Wooldridge, J., 2015, "Introductory Econometrics: A Modern Approach", 6th edition, Cengage Learning Custom Publishing.

Planning:

Week of	Lect. #	Lectures	Tutorial sessions	Lab sessions	Questions sessions	HWK due
		Chapter				
6-Sep	1	Presentation				
	2	Chap 1: OLS				
13-Sep	3					
	4	Chap 2: Tests				
20-Sep	5			1. Intro R, OLS		
	6					
27-Sep	7	Chap 3: GLS / NLS	1. OLS	2. OLS, Tests		
	8					
4-Oct	9			3. White, NLS, Tests	1	HW1
	10	Chap 4: IV				
11-Oct	-	Midterm	2. GLS, NLS			
	11					
18-Oct	12			4. IV		HW2
	13					
25-Oct	14	Chap 5: MLE	3. IV			
	15					
1-Nov	Break					
8-Nov	16		4. MLE			HW3
	-					
15-Nov	17			5. MLE		
	18					
22-Nov	19	Chap 6: GMM	5. MLE		2	
	20					
29-Nov			6. GMM			HW4
6-Dec					3	
13-Dec		Final exam				

Distance learning – Enseignement à distance :

Distance learning will not be implemented, unless the sanitary situation requires it.