THE GRADUATE INSTITUTE GENEVA

INSTITUT DE HAUTES ÉTUDES INTERNATIONALES ET DU DÉVELOPPEMENT
GRADUATE INSTITUTE OF INTERNATIONAL AND DEVELOPMENT STUDIES

International Economics
Development Economics

Academic year 2019-2020

Econometrics - Gerzensee Swiss Program for Beginning Doctoral Students

EI075 - Autumn - 6 ECTS

Course Description

The Swiss Program for Beginning Doctoral Students in Economics consists of a mathematics review (four days, optional) as well as sequences in microeconomics, macroeconomics and econometrics. In each sequence, leading international academics teach four week-long courses. Each course includes formal lectures of three hours per day as well as exercise review sessions. Course weeks start on Monday at 10:30 and end on Friday at noon. Returning to their home institutions in the periods between the course weeks, participants review and prepare the material covered in class, solve mandatory take-home problem sets, and study for the exams. On successful completion of the program, participants are awarded a Certificate.

Syllabus

1. Beginners' Program, page 4. List of Metrics topics per week (1 to 4)

2. Econometrics week 1 of the 2019-20 program, 1x course outline ("19BDP_week1").

3. Econometrics week 2, 3 and 4 of the 2018-19 program, 3x course outlines ("18BDP_week2", "week3" and "week4").

See below the outline for the 1st week, taking place from September 2-6, 2019. Program will be on www.szgerzensee.ch.

Swiss Program for Beginning Doctoral Students in Economics 2019

ECONOMETRICS

Week 1: September 2 - 6, 2019

Professor Mark W. Watson
Princeton University
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Course Schedule

Day	Lecture 1	Lecture 2	Readings & Exercises	Problem solving sessions
Monday	10:30 - 12:00	14:00 - 15:30	afternoon	
Tuesday	8:30 - 10:00	10:30 - 12:00	afternoon	evening
Wednesday	8:30 - 10:00	10:30 - 12:00	afternoon	evening
Thursday	8:30 - 10:00	10:30 - 12:00	afternoon	evening
Friday	8:30 - 10:00	10:30 - 12:00		

*Breaks Monday: 10 -10.30h; 15.30 - 16h; Lunch:12.15-13.30h
*Breaks Tuesday-Friday: 10 -10.30h; 15.30 –16h; Breakfast: 7 – 8.30h ; Lunch:12.15h ; Dinner: 19h (no dinner on Friday)

Arrival on Monday, September 2, 2019
No shuttles provided, kindly use public transport to/from the Study Center Gerzensee.

Preliminary Course Outline

Day 1

A. Introductory Remarks:
   1. Administrative Details
   2. Overview of Econometrics Sequence

B. Review of Probability Basics (HC/HCM Ch. 1-2):
   1. Probability Spaces
   2. Random Variables, Probability Distribution Functions, Probability Density Functions
   3. Expectations and Moment Generating Functions
   4. Multivariate Distributions and Conditional Distributions
   5. Transformations of Variables

Day 2

A. Some Specific Distributions (HC Ch. 3-4, Sec. 8.2, Ch. 12 / HCM Ch. 3, Sec. 9.8, 9.9), Uniform, Binomial, Poisson, Normal, Chi-Square, F, Students t, Multivariate Normal Distribution

B. Inequalities

C. Large Sample Theory (HC Ch.5, HCMCh. 4; Amemiya, pages 81-95))
   1. Convergence of sequences of random variables
   2. Laws of Large Numbers

Day 3

A. Large Sample Theory (Continued)
   3. Central Limit Theorems
   4. Continuous Mapping Theorem and Delta-method
   5. Examples

B. Estimators (HC Sections 6.1-6.2 and 11 / HCM Sec. 6.1-6.2, 6.4)
   1. Quality of Estimators (Loss and Risk, Admissability, Bias, Variance, MSE, Consistency, Asymptotic Normality, …)
   2. Bayes Estimators
   3. Unbiased Estimators and the Cramer-Rao Inequality
   4. Asymptotic Properties of Maximum Likelihood, Method of Moment, and Bayes Estimators

Day 4

A. Sufficient Statistics (HC Ch. 10 / HCM Ch. 7)

B. Hypothesis Testing (HC Ch.7 / HCM Ch. 8, Sections 6.3, 6.5)
   1. Null, Alternative, Type 1 and 2 Errors, Size, Power, Significance Level
   2. Wald Tests
   3. Best Critical Regions and the Neyman-Pearson Theorem
   4. Confidence Sets and Bayes Credible Sets

Day 5 (Catchup)

Week 1: Readings

Hogg, R.V and A.T. Craig, A Introduction to Mathematical Statistics, Fourth Edition, 1989, Macmillon Publishing (HC)
or
Hogg, R.V., J.W. McKean, and A.T. Craig, A Introduction to Mathematical Statistics, Sixth Edition, 2005, Macmillon Publishing (HCM)

Rao, C.R., Linear Statistical Inference and Its Applications, Second Edition, 1973, Wiley

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