

**CERGE-EI**

**Charles University in Prague  
Center for Economic Research and Graduate Education  
and  
the Economic Institute of the Academy of Sciences of the Czech Republic**

**Course Book for the Academic Year 2014-2015  
Summer & Preparatory Semester**

PhD Study Affairs Office

Prague, April 2015

*Printed version of this Course Book is subject to possible updates available  
at [https://iweb.cerge-ei.cz/phd/prog\\_details/coursebook/](https://iweb.cerge-ei.cz/phd/prog_details/coursebook/)*

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## I. THE STRUCTURE OF PH.D. STUDIES IN ECONOMICS AT CERGE

The Center for Economic Research and Graduate Education (CERGE) is a research and educational institute of Charles University. In close cooperation with the Economics Institute (EI) of the Academy of Sciences of the Czech Republic, CERGE offers a Ph.D. program in Economics, accredited by the Ministry of Education, Youth and Sport of the Czech Republic. Economic research is an integral part of CERGE activities.

### A. Contents and Organization of Graduate Study at CERGE

The basic mission of CERGE is to perform graduate studies in Economics and to train future university faculty and researchers and public administration representatives. The main idea of establishing the doctoral program curriculum is to transfer the modern Western system of Ph.D. study in Economics, as it is applied in the United States and some Western European countries, to the local environment and incorporate it into the structure of Czech university education within Charles University. The program offers economic education at a level comparable with world standards directly at Charles University, without the necessity of more expensive study abroad. Besides this fact, the best students may be offered the opportunity to visit (for up to one academic year) an appropriate university in the United States or Western Europe. This experience may enlarge their scope of knowledge significantly.

During the first two years of study courses are taught by the local and visiting faculty. Studies are conducted entirely in English. The duration of the doctoral study is four years. The first two years offer primarily systematic knowledge of theory; for the latter two years the students work on their dissertation. The transfer from study to independent research work is gradual and begins during the second year of study.

Further details on the program can be found in the handbook for graduate students.

### B. Core Study – The First Two Years

**In the first year** of study the students follow a common curriculum designed to provide a strong foundation in Microeconomic Theory, Macroeconomic Theory, Statistics and Econometrics, and Academic Writing. This curriculum is standard for the PhD study in Economics. The study is divided into three semesters: the fall semester (FS), the spring semester (SS), and the summer semester (SuS). In view of the fact that many newly recruited students do not have an extensive background in modern Economics equivalent to "western" standards, and also that their knowledge of Mathematics and English are frequently at different levels, a preparatory semester is organized for potential students. It allows CERGE to provide the students with some basic tools as an introduction to the program and to achieve a standard level of competence.

**The second year** of formal study at CERGE provides students with the opportunity to investigate more specific fields of interest. Several courses (usually five or more) are offered each of the two semesters, and the second year students must enroll for a minimum of three, plus a course in English. The students participate in a seminar series and are now expected to begin their own research.

Having completed both the first and second years, students must pass a General (comprehensive) examination. After the first year, the students must pass Microeconomic Theory, Macroeconomic Theory, and Econometrics; after the second year they must show proficiency in at least two specialized fields by passing General (field) exams in their chosen areas of interest.

During the first two years of study the students do not have a special supervisor; rather, they rely on the advice of the Deputy Director of Graduate Studies, who is also one of the CERGE faculty members. The program and organization of graduate study is regulated by a CERGE's Graduate Council (GC).

### C. Specialized Study – Third and Fourth Years

During the spring semester of the second year and the fall semester of the third year, the students have to choose the topic of their dissertations. A tentative chair as a supervisor is then assigned. By the middle of the third year (at the latest), they formulate a thesis proposal and public defense is required together with state doctoral examination. For students who passed all General examinations with distinction, the main importance will be placed on the defense of the thesis proposal. Those with less than distinctive examination results can also expect additional detailed questions from respective fields. After having successfully defended the proposal, a three-member dissertation committee is appointed which guides and supervises the study and research work.

At least one member of the dissertation committee has to be an employee of CERGE or EI. Under the guidance of this committee the student works on his or her dissertation. In the fourth year the students present their third year work at the Dissertation workshop and prepare for the defense of the dissertation. The study is concluded by the public defense of the doctoral dissertation.

### D. Study Program

Here we present the courses designed for the preparatory semester, the first, second and third year of study. (One lecture/exercise unit is 45 minutes long.)

#### Preparatory semester

Subject	(Lecture hours / exercise hours)
Macroeconomics 0	4/2, Exam
Microeconomics 0	4/2, Exam
Mathematics	4/2, Exam

**Notes:** Upon completion of the preparatory semester, the final selection of students is made to enter the doctoral program in the fall, based on final exam results.

### First year

Subject	Fall	Spring	Summer
Microeconomics I, II, III	4/2, Exam	4/2, Exam	4/2, Exam
Macroeconomics I, II, III	4/2, Exam	4/2, Exam	4/2, Exam
Statistics / Econometrics	4/2, Exam	4/2, Exam	4/2, Exam
Academic Writing I	---	4/0 Credit	---

#### Notes:

After completing the first year, each student must pass the General examination in the fields of Microeconomics, Macroeconomics and Econometrics.

### Second Year

Subject	Fall	Spring	Summer
Econometrics III, IV	4/2, Exam	4/2, Exam	---
Industrial Organization	4/2, Exam	---	---
Advanced Game Theory	---	4/2, Exam	---
Financial Markets I, II	4/2, Exam	4/2, Exam	---
Empirical Methods	4/2, Exam	---	---
Labor Economics	---	4/2, Exam	---
Energy Economics	4/2, Exam	---	---
Social & Economic Networks	---	4/2, Exam	---
Macro Topics I, II	4/2, Exam	4/2, Exam	---
Academic Writing II	4/0, Credit	---	---
Research Methodology Seminar	Mandatory	Mandatory	Mandatory
Combined Skills I	---	4/0, Credit	---
Research Seminars	0/2, Credit	0/2, Credit	---
Directed Research	---	---	0/2, Credit
Combined Skills II – M.A.	---	---	0/2, Credit

#### Notes:

\* Second-year students choose at least three (exam-ended) courses per semester. The courses cannot be from the same field. Courses offered may differ slightly from year to year, depending on the faculty in residence.

\* The credits for English courses, the Research Seminars and Directed Research are mandatory.

\* The credit for Research Methodology Seminar will be awarded based on individual consultations with the instructors and based on individual written work.

\* After completing the second year each student must pass General exam in two fields. Upon agreement of CERGE, a student may complete part of his/her study at another university - this is valid not only for individual courses, but also for a whole study year.

\* Topic courses are one semester courses not forming two semester sequence and do not cover comprehensively all material needed for Field General Exam.

\* Combined Skills II – M.A. is for M.A. students only, a paper or report appropriate for the MA-degree writing requirement.

### Third year

Subject	Fall	Spring	Summer
Combined Skills II – Ph.D.	Credit	---	---

**Notes:** Normally, students must pass the 2-year MA program first as a pre-requisite for registering in CSII-Ph.D.

## II. SYLLABI OF THE SUMMER SEMESTER COURSES

### A. First year courses

#### MICROECONOMICS III

**Lecturers:**

Fabio Michelucci

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**Teaching assistants:**

Dali Tsintskiladze

(Dali.Tsintskiladze@cerge-ei.cz)

Mykola Babiak

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**Office hours:**

TBA

Classes: Mondays and Tuesdays 10.30-12:00

Exercise sessions: Mondays 13.30-15:00

**Course information**

This is the third course in the micro core sequence. The emphasis of this course is on informational asymmetries, auction theory and mechanism design.

**Requirements and grading**

Final (100%).

The course will be accompanied by exercise sessions in which the TAs will either go over problem set solutions or do a review of some selected course material.

**Readings**Principal textbooks:

- ✓ Geoffrey Jehle, and Phil Reny, *Advanced Microeconomic Theory*, Prentice Hall.
- ✓ Krishna, Vijay (2010), *Auction Theory*, Academic Press. Second Edition.
- ✓ Mas-Colell, A., M. Whinston and J. Green (1995), *Microeconomic Theory*, Oxford University Press (henceforth, MWG).
- ✓ Salanie, Bernard (2005), *The Economics of Contracts: A Primer*, 2nd Edition, MIT Press

Recommended and supplementary textbooks:

- ✓ Bolton, P. and M. Dewatripont (2005), *Contract Theory*, MIT Press.
- ✓ Fudenberg, Drew and Jean Tirole (1991), *Game Theory*, MIT Press (henceforth, FT).
- ✓ Gibbons, R. (1992), *Game Theory for Applied Economists*, Princeton University Press.

- ✓ Kreps, D. (1990), *A Course in Microeconomic Theory*, Princeton University Press.
- ✓ Laffont, Jean-Jacques and Martimort, David (2001), *The Theory of Incentives: The Principal-Agent Model*, Princeton University Press.

### Topics & readings

This is a suggestive outline of what we will cover in the course. Not all material will be covered. Items marked with an \* are required readings. Others are recommended.

### **Applications of Game Theory to Static Models of Oligopoly**

- a) Cournot Model
- b) Stackelberg Model
- c) Bertrand Model

\* MWG: 12.C

### **Information Asymmetries**

- a) Adverse Selection
- b) Signaling
- c) Screening
- d) Cheap Talk Communication

\* MWG: 13

\* JR: 8.1

\* Salanie 2

- ✓ Akerlof, G. (1970), "The Market for Lemons: Quality and the Market Mechanism," *Quarterly Journal of Economics*, 84, pp. 488-500.
- ✓ Crawford, V. P. and J. Sobel (1982), "Strategic Information Transmission," *Econometrica*, 50, pp. 1431-1451.
- ✓ Milgrom, P. (1981), "Good News and Bad News: Representation Theorems and Applications," *Bell Journal of Economics*, 12: pp. 380-391.
- ✓ Rothschild M. and J. Stiglitz (1976), "Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information," *Quarterly Journal of Economics*, 90, pp. 629-649.
- ✓ Spence, A. M. (1973), "Job Market Signaling," *Quarterly Journal of Economics*, 87, pp. 355-374.
- ✓ Spence, A. M. (1974), *Market Signaling*, Cambridge University Press.
- ✓ Wilson, C. (1980), "A Model of Insurance Markets with Incomplete Information," *Journal of Economic Theory*, 16, pp. 167-207.

### **Principal-Agent Problem**

- a) Hidden Actions (Moral Hazard)
- b) Hidden Information
- c) Incomplete Contracts

\* MWG: 14

\* JR: 8.2

\* Salanie 7

- ✓ Baron, D. and R. Myerson (1982), "Regulating a Monopolist with Unknown Costs," *Econometrica*, 50, pp. 911-930.
- ✓ Grossman, S. and O. Hart (1983), "An Analysis of the Principal-Agent Problem," *Econometrica*, 51, pp. 7-45.
- ✓ Hart and Holmstrom, (1987), "The Theory of Contracts, Part I," in *Advances in Economic Theory*, 5<sup>th</sup> World Congress, editor T. Bewley, Cambridge University Press.
- ✓ Hart and Holmstrom, (1987), "The Theory of Contracts, Part II," in *Advances in Economic Theory*, 5<sup>th</sup> World Congress, editor T. Bewley, Cambridge University Press.

- ✓ Maskin, E. and J. Riley (1984), "Monopoly with Incomplete Information," *Rand Journal of Economics*, 15, pp. 171-196.

### Auction Theory

- a) Private Value Auctions
- b) Revenue Equivalence
- c) Auctions with Interdependent Values
- d) Linkage Principle
- e) Extensions:
  - 1. Risk-Averse Bidders
  - 2. Budget Constraints
  - 3. Asymmetric Bidders
  - 4. Resale
  - 5. Collusion
  - 6. Sequential Auctions

\* Krishna: 2, 3, 4, 6, 7, 12

- ✓ Maskin, E. and J. Riley (1984), "Monopoly with Incomplete Information," *Rand Journal of Economics*, 15, pp. 171-196.
- ✓ Ausubel, L. (1999), "A Generalized Vickrey Auction," mimeo, University of Maryland.
- ✓ Che, Y-K. and I. Gale (1998), "Standard Auctions with Financially Constrained Bidders," *Review of Economic Studies*, 65, pp. 1-22.
- ✓ Engelbrecht-Wiggans, R., Milgrom, P. and R. Weber (1983), "Competitive Bidding and Proprietary Information," *Journal of Mathematical Economics* 11, pp. 161-169.
- ✓ Klemperer, P. (2002), "What Really Matters in Auction Design," *Journal of Economic Perspectives*, 16, pp. 169-190.
- ✓ Klemperer, P. (2003), "Why Every Economist Should Learn Some Auction Theory," in *Advances in Economics and Econometrics*, editors M. Dewatripont, L. Hansen and S. Turnovsky, Cambridge University Press.
- ✓ McAfee, R.P. and J. McMillan (1987), "Auctions and Bidding," *Journal of Economic Literature*, 25, pp. 699-738.
- ✓ McAfee, P. and J. McMillan (1992), "Bidding Rings," *American of Economic Review*, 82, pp. 579-599.
- ✓ Milgrom, P. (1981), "Rational Expectations, Information Acquisition, and Competitive Bidding," *Econometrica*, 49, pp. 921-943.
- ✓ \* Milgrom, P. and R. Weber (1982), "A Theory of Auctions and Competitive Bidding," *Econometrica*, 50, pp. 1089-1122.
- ✓ Milgrom, P. and R. Weber (2000), "A Theory of Auctions and Competitive Bidding II," in *The Economic Theory of Auctions*, editor P. Klemperer, Edward Elgar - Cheltenham.
- ✓ Vickrey, W. (1961), "Counterspeculation, Auctions, and Competitive Sealed Tenders," *Journal of Finance*, 93, pp. 675-689.

### Mechanism Design

- a) Mechanisms
- b) Revelation Principle
- c) Optimal Mechanisms
- d) Efficient Mechanisms
- e) Applications
  - 1. Auctions
  - 2. Nonlinear Pricing
  - 3. Bilateral Trading
  - 4.

FT: 7

\* Krishna: 5

MWG: 23



- ✓ Armstrong, M. (2000), "Optimal Multi-Object Auctions," *Review of Economic Studies*, 67, pp. 455-481.
- ✓ Bergemann, D. and J. Välimäki (2002), "Information Acquisition and Efficient Mechanism Design," *Econometrica*, 70, pp. 1007-1033.
- ✓ Bulow, J. and P. Klemperer (1996), "Auctions versus Negotiations," *American Economic Review*, 86, pp. 180-194.
- ✓ Bulow, J. and J. Roberts (1989), "The Simple Economics of Optimal Auctions," *Journal of Political Economy*, 97, pp. 1060-90.
- ✓ d'Aspremont, C. and L. Gerard-Varet (1979), "Incentives and Incomplete Information," *Journal of Public Economics*, 11, pp. 24-45.
- ✓ Dasgupta, P. and E. Maskin (2000), "Efficient Auctions," *Quarterly Journal of Economics*, 115, pp. 341-388.
- ✓ Engelbrecht-Wiggans, R. (1993), "Optimal Auctions Revisited," *Games and Economic Behavior*, 5, pp. 227-239.
- ✓ Groves, T. (1973), "Incentives in Teams," *Econometrica*, 41, pp. 617-631.
- ✓ Harris, M. and A. Raviv (1981), "Allocation Mechanisms and the Design of Auctions," *Econometrica*, 49, pp. 1477-1499.
- ✓ Harris, M. and R. Townsend (1981), "Resource Allocation under Asymmetric Information," *Econometrica*, 49, pp. 1477-99.
- ✓ Holmstrom, B. and R. Myerson (1983), "Efficient and Durable Decision Rules with Incomplete Information," *Econometrica*, 51, pp. 1799-1820.
- ✓ Krishna, V. and M. Perry (1998), "Efficient Mechanism Design," mimeo, Penn State University and Hebrew University of Jerusalem.
- ✓ Maskin, E. (2003), "Auctions and Efficiency," in *Advances in Economics and Econometrics*, editors M. Dewatripont, L. Hansen and S. Turnovsky, Cambridge University Press.
- ✓ Maskin, E. and J. Riley (1984), "Optimal Auctions with Risk Averse Buyers," *Econometrica*, 52, pp. 1473-1518.
- ✓ McAfee, R.P. (1991), "Efficient Allocation with Continuous Quantities," *Journal of Economic Theory*, 53, pp. 51-74.
- ✓ McAfee, R.P. (1993), "Mechanism Design by Competing Sellers," *Econometrica*, 61, pp. 1281-1312.
- ✓ Myerson, R. (1979), "Incentive Compatibility and the Bargaining Problem," *Econometrica*, 47, pp. 61-74.
- ✓ Myerson, R. (1981), "Optimal Auction Design," *Mathematics of Operations Research*, 6, pp. 58-73.
- ✓ Myerson, R. (1982), "Optimal Coordination Mechanisms in Generalized Principal-Agent Problems," *Journal of Mathematical Economics*, 10, pp. 67-81.
- ✓ Myerson, R. and M. Satterthwaite (1983), "Efficient Mechanisms for Bilateral Trading," *Journal of Economic Theory*, 28, pp. 265-281.
- ✓ Perry, M. and P. Reny (2002), "An Efficient Auction," *Econometrica*, 70, pp. 1199-1212.
- ✓ Riley, J. and W. Samuelson (1981), "Optimal Auctions," *American Economic Review* 71, pp. 381-392.

## MACROECONOMICS III / Part I

**Lecturer:**

Byeongju Jeong

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**Teaching assistant:**

Taras Hrendash

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**Office hours:**

TBA

### Course information

We will study some macro topics. Listed below are the main references in the order of discussion. You are strongly advised to read the papers in advance of lectures since the lectures will build on the basic understanding of the papers.

### Requirements and grading

The grade is based on the midterm (two-third), and occasional home problems (one-third).

### Readings

- ✓ Gertler, M. and Karadi, P. (2011), "A Model of Unconventional Monetary Policy," *Journal of Monetary Economics* 58: 17-34.
- ✓ Gali, J. (2014), "Monetary Policy and Rational Asset Price Bubbles," *American Economic Review* 104: 721-752.
- ✓ Bagger, J., Fontaine, F., Postel-Vinay, F., and Robin, J. (2014), "Tenure, Experience, Human Capital, and Wages: A Tractable Equilibrium Search Model of Wage Dynamics," *American Economic Review* 104: 1551-1596.
- ✓ Acemoglu, D. and Shimer, R. (2000), "Productivity Gains from Unemployment Insurance," *European Economic Review* 44: 1195-1224.
- ✓ Pallais, A. (2014), "Inefficient Hiring in Entry-Level Labor Markets," *American Economic Review* 104: 3565-3599.

## MACROECONOMICS III / Part II

**Lecturer:**

Filip Matějka

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**Teaching assistant:**

Nikoloz Kudashvili

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**Office hours:**

TBA

### Course information

The course will focus on the implications of imperfect information in macroeconomics. We will review models of signal extraction, sticky information and rational inattention. If time permits, we will also discuss sticky-price models and the fiscal theory of price level.

### Requirements and grading

The grade is based on the exam (two-thirds) and occasional home problems (one-third).

### Readings

- ✓ Calvo, G. Staggered prices in a utility-maximizing framework. *Journal of Monetary Economics*, 1983.
- ✓ Lucas, R.E.: Some International Evidence on Output-Inflation trade-Offs. *American Economic Review*, 1973.
- ✓ Mankiw N.G., Reis R.: Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve. *Quarterly Journal of Economics*, 2002.
- ✓ Sims, C.A.: Implications of Rational Inattention. *Journal of Monetary Economics*, 50, 2003.
- ✓ Sims, C.A.: Rational Inattention: A Research Agenda. 2005.

## ECONOMETRICS II

**Lecturers:**

Nikolas Mittag

(Nikolas.Mittag@cerge-ei.cz, office 304, phone 128)

**Teaching assistants:**

Jelena Plazonja

(Jelena.Plazonja@cerge-ei.cz)

Gega Todua

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**Office hours:**

Tuesday 16:30-18:30

**Class website:**

CMS ([cms.cerge-ei.cz](https://cms.cerge-ei.cz))

### Course information

This course is the third part of the Statistics-Econometrics sequence. The class will focus on three topics that extend the methods from Econometrics I: First, we will discuss some common problems of OLS. Second, we will cover the standard panel data methods. Third, we will talk about non-linear models, particularly models for binary outcomes and models of sample selection, mainly focusing on maximum likelihood estimation. The main goal is to provide a basic understanding of common econometric methods and models and familiarize students with problems that frequently arise in applications.

### Course outline:

#### I. Additional Topics in Cross-Sectional Estimation

- ✓ Review
- ✓ Measurement Error and Proxy Variables
- ✓ Missing Data and Nonrandom Samples
- ✓ Omitted Variable Bias

#### II. Panel Data Methods

- ✓ Pooling Cross Sections across Time
- ✓ Random Effect Models
- ✓ Clustering
- ✓ Fixed Effect Models
- ✓ Hausman Test

#### III. Limited Dependent Variable Models and Sample Selection

- ✓ Models for Binary Outcomes
- ✓ Multinomial Models
- ✓ Censoring and Truncation
- ✓ Sample Selection Models

### Requirements and grading:

Midterm exam (30%)  
Final exam (40%)  
Assignments (30%)

### Readings

The main text book for the class is:

- ✓ Cameron, A.C. and P.K. Trivedi, *Microeconometrics: Methods and Applications*, Cambridge University Press, 2005.

Two good alternatives are:

- ✓ Greene, W.H. *Econometric Analysis*, 5th edition, Prentice Hall, 2003.
- ✓ Wooldridge, J.M. *Econometric Analysis of Cross Section and Panel Data*, Massachusetts Institute of Technology, 2002.

A more detailed reading list and further readings will be available on the class website.

### Exercise session

To be announced.

## RESEARCH METHODOLOGY SEMINAR

#### Lecturers:

Nikolas Mittag

(Nikolas.Mittag@cerge-ei.cz, office 304, phone 128)

Jakub Steiner

(Jakub.Steiner@cerge-ei.cz; office 316, phone 182)

#### Teaching Assistant:

Zurab Abramishvili

(Zurab.Abramishvili@cerge-ei.cz)

#### Office hours:

TBA

### Course Information

**The Research Methodology Seminar** is designed to help you prepare for research through consultations and presentation during the second year of your study.

**Consultations:** Students should identify one (or more) CERGE-EI faculty who could supervise their thesis and have regular conversations with them.

**Progress Report:** Due July 21. Students are asked to submit a 1-page summary of what they have done so far, what they are planning to do, which CERGE-EI faculty are involved and what feedback the student has received so far on his/her projects.

**Presentations:** During the first week of fall semester, students will give a talk on their research proposal or paper and receive feedback from RMS coordinators and others.

**One-page Project Proposal (for students enrolling in Combined Skills 2 – MA)** By June 22<sup>nd</sup>, students must submit a one-page proposal outlining and motivating the paper they would like to produce for approval. Unless otherwise agreed upon, contact Nikolas Mittag regarding MA papers.

**Deadlines for final MA papers (for students enrolling in Combined Skills 2 – MA):** September 13, 2015, by 23.59.

## COMBINED SKILLS II - MA

**Lecturer:**

Paul Whitaker

(Paul.Whitaker@cerge-ei.cz; office 315, phone 259)

**Teaching assistant:**

Zurab Abramishvili

(Zurab.Abramishvili@cerge-ei.cz)

**Office hours:**

TBA

### Course Information

**CS2 MA** is designed to support students writing extended graduate level economics papers in English.

**Class Meetings:**

The course begins with one full-class meeting Wednesday, 22 April, 13.00-15.00, room TBA. Students will be assigned to small working teams for ongoing peer input into the development of their papers.

**Consultations:**

Consultations form the majority of the course. They should be planned in advance with the instructor, and it is the student's responsibility to prepare and bring their specific questions regarding the work to each consultation.

**Submissions:**

One page Project Proposal by June 22<sup>nd</sup>. Students must submit a one-page proposal outlining and motivating the paper they would like to produce. Students should contact Nikolas Mittag regarding the content of MA papers. The proposal should be submitted to both Paul Whitaker and Nikolas Mittag.

**Final Papers:** Due to the ASC on September 6, via Turnitin, by 23.59. Due to Nikolas Mittag on September 13<sup>th</sup>, by 23.59.

### III. SYLLABI OF THE PREPARATORY SEMESTER COURSES

#### MICROECONOMICS 0

**Lecturer:**

Fabio Michelucci

(Fabio.Michelucci@cerge-ei.cz; office 324, phone 117)

**Teaching assistant:**

Peter Štefko

(Peter.Stefko@cerge-ei.cz)

**Office hours:**

TBA

Classes: Mondays and Tuesdays 10.30-12

Exercise sessions: TBA

**Course information**

This course is intended to provide a fast-paced coverage of basic and intermediate microeconomics. We will develop intuitive concepts and tools that economists use to explain a wide range of social phenomena.

**Requirements and grading**

Problem Sets 15%, Final 85%

Problem sets will be assigned regularly and will be due on the exercise sessions. At the sessions, teaching assistants will discuss answers to problem sets and solve additional problems.

**Course outline**

We will cover selected topics from those below, following closely the related chapters from Varian's book:

- 1) How economists think and the basic market model.
- 2) Budget constraints, preferences, utility
- 3) Choice, demand curve, consumer surplus
- 4) Intertemporal choice and interest rates
- 5) Choice under Uncertainty
- 6) Production: technology, profit minimization, cost curves
- 7) Firm and industry supply
- 8) Market equilibrium and comparative statics
- 9) Externalities and public goods
- 10) Basics of game theory
- 11) Monopoly and regulation
- 12) Exchange and comparative advantage
- 13) Asymmetric information

## Readings

### Main textbook

- ✓ Varian, Hal R: *Intermediate Microeconomics – a modern approach*. (6<sup>th</sup> edition), Norton & Co. 2003.

### Further suggested readings

- ✓ Friedman, David: *Price theory – an intermediate text* (2<sup>nd</sup> edition), Southwestern Publishing Co, 1990. (chapters 1 and 2 are required)
- ✓ Perloff, Jeffrey (2004), *Microeconomics* (3rd edition), Pearson Education Inc.

## MACROECONOMICS 0

### **Lecturer:**

Byeongju Jeong

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### **Teaching assistant:**

Iryna Chaplia

(Iryna.Chaplia@cerge-ei.cz)

Myroslav Piduyko

(Myroslav.Pidkuyko@cerge-ei.cz)

### **Office hours:**

TBA

## Course information

We will study select chapters of *Macroeconomics* by Matthias Doepke, Andreas Lehnert, and Andrew W. Sellgren. This manuscript is freely available at:

<http://faculty.wcas.northwestern.edu/~mdo738/book.htm>

Below are the chapters of the book that will be covered. You are strongly advised to read the chapters in advance of lectures since the lectures will build on the basic understanding of the contents of the chapters. Additional chapters will be covered if there are remaining lecture slots after covering these chapters.

## Requirements and grading

The grade is based on the final exam (two-thirds), and occasional home problems (one-third).

## Readings

02. Work Effort, Production, and Consumption
03. The Behavior of Households with Markets for Commodities and Credit



- 06. The Labor Market
- 08. Inflation
- 11. Economic Growth
- 13. The Effect of Taxation
- 14. The Optimal Path of Government Debt
- 17. Financial Intermediation
- 18. Fiscal and Monetary Policy
- 19. Optimal Monetary Policy

## MATHEMATICS 0

**Lecturer:**

Sherzod Tashpulatov

(Sherzod.Tashpulatov@cerge-ei.cz; office 105, phone 131)

**Teaching assistant:**

TBA

**Office hours:**

TBA

**Class website:**

<http://home.cerge-ei.cz/tashpulatov/>

### Course information

This course is designed to make you familiar with basic mathematical tools, concepts and techniques used in modern economic analysis, and discuss a variety of applications you may encounter in your further economics studies.

### Course outline

**1. Linear Algebra ([Ch 4, 5, 11], [SB 6-9, 16, 23, 26], [SHSS 1], [Tu 1-4], [V 1.1-1.5]).<sup>1</sup>**

- types of matrices and properties/laws of matrix operations;
- linear (in)dependence of vectors and the rank of a matrix;
- the definition of determinant and Laplace expansion theorem;
- methods of solving systems of linear equations: Cramer's rule, Gauss method, the inverse matrix method;
- quadratic forms;
- linear mapping; eigenvalues and eigenvectors; diagonalization of a quadratic form;
- tests for sign definiteness.

**2. Calculus and Unconstrained Optimization ([Ch 6-9, 11, 13], [SB 2-5, 12-15, 17, 20, 29, 30, A1], [SHSS 2-4, 12, 13, A1], [Tu 5-8], [V 2.1-2.8]).**

- basics of mathematical logic and set theory;
- the concept of limit, operations with limits, limit theorems, L'Hopital rule;

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<sup>1</sup> Hereafter the figures in brackets denote the corresponding chapter(s) in principal textbooks. Presentation of the material may vary from text to text, thus you can choose the one that fits you best. As a rule of thumb, the author of [Tu] believes that [Tu] and [Ch] are set at a similar level, while [SB] and [SHSS] are more advanced as compared to [Tu].

- the derivative and the slope of a curve; continuity and differentiability of a function (one variable case);
- concavity and convexity, tests for concavity and convexity; Jensen's inequality (one variable case);
- extreme values of a function (one variable case);
- Taylor series (one variable case);
- fixed point theorem; contractionary mapping;
- the derivative of implicit function;
- partial differentiation and Jacobian determinants;
- differentials, total differentials and total derivatives;
- extreme values of a function of two or more variables; first and second order conditions;
- indefinite integrals, rules of integration;
- the concept of measure; definite integrals; improper integrals.

### **3. Constrained Optimization ([Ch 12, 19-21], [SB 18-19], [SHSS 3], [Tu 6-7], [V 3]).**

- equality constrained optimization; Lagrangian, Lagrange multiplier method; second-order conditions;
- comparative static analysis in optimization problems; envelope theorem;
- quasiconcavity and quasiconvexity;
- linear programming; nonnegativity/inequality constraints; feasible region; gradient;
- nonnegativity/inequality constrained optimization; Kuhn-Tucker conditions;
- constraint qualification test;
- Kuhn-Tucker and Arrow-Enthoven sufficiency theorems.

### **4. Dynamics ([Ch 14-18], [SB 24, 25], [SHSS 5-12], [Tu 9-11], [V 4]).**

- differential equations: an overview;
- linear differential equations with constant coefficients;
- systems of linear differential equations; phase diagrams;
- linear difference equations;
- higher order difference equations; characteristic equation;
- systems of difference equations;
- introduction into optimal control theory, dynamic optimization;
- continuous time vs. discrete time; function vs. functional;
- law of motion; Hamiltonian; transversality condition (TVC); inequality constraints (continuous case);
- law of motion; Lagrangian; transversality condition (TVC) (discrete case).

### **5. Basics of Probability Theory (Lecture notes).**

- random outcomes; trials; random variable; classical probability; probability distribution;
- conditional probability; total probability; Bayes rule;
- Bernoulli trials, uniform distribution; normal distribution; discrete vs. continuous random variable;
- percentiles, value at risk (VaR) model;
- calculation of expected value and variance; economic examples (electricity prices; risk/uncertainty; collusion);
- application of uniform distribution: Monte Carlo simulation in calculating definite integrals (MatLab);
- Markov chains; states; graph and matrix representations; stationary probability distribution; application of Markov chains and graph theory for calculating probabilities of ratings of companies over time.

### **Requirements and grading**

Grades will be based on student's performance in quizzes, written assignments, midterm exam, and final exam:

Quizzes	8%
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Written assignments	12%
Midterm exam	30%
Final exam	50%

On the first lecture students will write placement exam. Students with excellent grades (A+, A, A-) will be exempted from quizzes, written assignments, midterm exam, participation in lectures and seminars. However they will be asked to write the regular final exam in the end of the course.

## Readings

### Principal Texts

- ✓ Chiang A.C. *Fundamental Methods of Mathematical Economics*. [Ch]
- ✓ Simon C., and Blume L. *Mathematics for Economists*. [SB]
- ✓ Sydsæter K., Hammond P., Seierstad A., and Strøm A. *Further Mathematics for Economic Analysis*. [SHSS]
- ✓ Turkington D.A. *Mathematical Tools for Economists*. [Tu]

### Reference Text

- ✓ Vinogradov V. *A Cook-Book of Mathematics (Recipes for Economists)*.
- ✓ Vinogradov V. *Mathematics for Economists made simple*. Karolinum Press, 2010. [V]

### Additional Reading

- ✓ Chiang A.C. *Elements of Dynamic Optimization*.
- ✓ Intrilligator M.D. *Mathematical Optimization and Economic Theory*.
- ✓ Kamien M.I., and Schwarz N.L. *Dynamic Optimization*.
- ✓ Leonard D., and Ngo V.L. *Optimal Control Theory and Static Optimization in Economics*.
- ✓ Takayama A. *Analytical Methods in Economics*.
- ✓ Yamane T. *Mathematics for Economists*.

When relevant, updates that supersede this hardcopy can be found on the internal pages of the website at: [https://iweb.cerge-ei.cz/phd/prog\\_details/coursebook/](https://iweb.cerge-ei.cz/phd/prog_details/coursebook/)

#### **IV. PROFESSORS AND LECTURERS TEACHING IN THE SUMMER SEMESTER 2015**

##### **Byeongju Jeong, Ph.D.**

Mellon Endowment Associate Professor with Tenure

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Byeongju Jeong is the Mellon Endowment Associate Professor with tenure at CERGE-EI (under US permanent charter) and a member of the Executive and Supervisory Committee of CERGE-EI since 2003. He is also an Assistant Professor at CERGE, Charles University and a Researcher at the Economics Institute of the Academy of Sciences of the Czech Republic (EI) since 1997. He served as the Deputy Director for Graduate Studies at CERGE and EI from 2010 to 2012. Graduated from the University of Texas with a B.A. degree in Economics in 1991. Received a M.A. in Economics from the University of Minnesota in 1994, and a Ph.D. in Economics from the University of Minnesota in 1996. Lecturer at Pennsylvania State University from 1996 to 1997. Visiting professor at Universitat Pompeu Fabra in Barcelona from 2003 to 2004.

Research orientation:

Growth and development, macro labor, international macro.

##### **Fabio Michelucci, Ph.D.**

Assistant Professor

Email: Fabio.Michelucci@cerge-ei.cz

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Fabio Michelucci is an Assistant Professor at CERGE-EI (under US permanent charter) and at CERGE, Charles University and a Researcher at the Economics Institute of the Academy of Sciences of the Czech Republic since 2009. Earned his B.A. degree in Economics, summa cum laude (2000), from the University of Florence, Italy; M.Sc. degree in Economics (2001) from the Universitat Pompeu Fabra, Spain; Ph.D. degree in Economics (2007) from University College London, United Kingdom. From 2002 until 2006 he was working as a Teaching Assistant at the University College London, United Kingdom. In 2006 he was also working as a Researcher (Assegnista di Ricerca) at Bocconi University, Italy. From 2007 to March 2009 he was a Post-doctoral Scholar at the Division of the Humanities and Social Sciences, California Institute of Technology, USA. He is a holder of Mario Landi Award, Amici di Villa Favard, University of Florence (2001-2002), and also a holder of Instituto Valenciano de Investigaciones Economicas Award for the paper "Second Best Efficiency in Auctions" (2005). He obtained a Bank of Italy scholarship, Bonaldo Stringher (2001-2003), and an Ente Luigi Einaudi Scholarship (2003-2004).

Research orientation:

Economic theory, industrial organization, mechanism design, auction theory, and experimental economics.

**Nikolas Mittag, Ph.D.**  
Assistant Professor

Email: [Nikolas.Mittag@cerge-ei.cz](mailto:Nikolas.Mittag@cerge-ei.cz)

Nikolas Mittag has been an Assistant Professor at CERGE-EI (under U.S. permanent charter) as of September 2013 and an Assistant Professor at CERGE, Charles University, since July 2013. He has also worked as a Researcher at the Economics Institute of the Academy of Sciences of the Czech Republic from September 2013. He received his B.A. degree in Philosophy & Economics from the University of Bayreuth (2007) and his Ph.D. in Public Policy Studies from the Harris School of Public Policy at the University of Chicago. He was a fellow (Program on Political Institutions) at the Harris School of Public Policy in 2009 and received a dissertation fellowship from the U.S. Census Bureau, USA (2011-2013).

Research orientation:

Applied econometrics, microeconomics, public economics, program evaluation.

**Sherzod Tashpulatov, Ph.D.**

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Sherzod Tashpulatov is a Ph.D. graduate from CERGE-EI. He worked on his dissertation on energy markets liberalization under the supervision of doc. Ing. Lubomír Lízal, Ph.D. Two chapters of his dissertation research have been published in top field international journals.

Prior to coming to CERGE-EI, he studied at Lomonosov Moscow State University in Russia, specializing in mathematical methods in economic analysis. His research interests include energy economics, applied microeconomics, dynamic modelling and optimization, and mathematical methods in economic analysis.

**Paul Whitaker, M.A.**  
Academic Skills Center Lecturer

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Paul Whitaker has been teaching at CERGE-EI since August 2014. He earned his Master's from the University of Nottingham, England in 2000. Before coming to CERGE-EI, Paul taught at the Higher Colleges of Technology in the UAE and the School of Business Administration in Karviná, Czech Republic. He also worked for many years as a teacher trainer and business skills trainer focusing on presentation and communication skills for multinational companies.

Research orientation:

Effective communication, student-centered learning approaches and teacher training.

## V. ACADEMIC CALENDAR 2014 – 2015

Academic Calendar for MA/PhD Program 2014/2015 (last update: 4 February 2014)

Month	September	October	November	December	January	February	March	April	May	June	July	August
Week	1-5 8-12 15-19 22-26 29-31	27-31 20-24 13-17 6-10 29-31	24-28 17-21 10-14 3-7 27-31	1-5 8-12 15-19 22-26 29-31	5-9 12-16 19-23 26-30 29-2	2-6 9-13 16-20 23-27 22-27	2-6 9-13 16-20 23-27 22-27	30-3 13-17 20-24 27-1	4-8 11-15 18-22 25-29	1-5 8-12 15-19 22-26 29-31	6-10 13-17 20-24 27-31	3-7 10-14 17-21 24-28 31-4
1st year students	H	Fall Semester	Fall Semester	Holidays	Holidays	Spring Semester	Spring Semester	H	Summer Semester	Summer Semester	RMS	H
2nd year students	H	Fall Semester	Fall Semester	Holidays	Holidays	Spring Semester	Spring Semester	H	Summer Semester	Summer Semester	RMS	H
3rd and 4th year students	H	Fall Semester	Fall Semester	Holidays	Holidays	Spring Semester	Spring Semester	H	Research Seminar Series	Research Seminar Series	RMS	H
Preparatory semester												Preparatory Semester
	A/D	add / drop period										
	G	general-exams week										
	F	final-exams week										
	M	midterm-exams week										
	U	make-up general-exams week										
	P	graduation ceremony										
	H	official CERGE holiday										
	DPW	dissertation proposal workshops week										
	DAV	dissertation workshops week										
	*	public holidays (all official public holidays in the Czech Republic) - classes supposed to take place in these days will be re-scheduled:										
		28 September - Czech Statehood Day (Sunday)										
		28 October - Establishment of the Czechoslovak Republic (Tuesday)										
		17 November - Freedom and Democracy Day (Monday)										
		24 December - Christmas Eve (Wednesday)										
		25 December - Christmas Day (Thursday)										
		26 December - Christmas Day (Friday)										
		1 January - New Year's Day (Thursday)										
		6 April (Easter Monday)										
		1 May - Labor Day (Friday)										
		8 May - Liberation from Fascism (Friday)										
		5 July - Cyril and Methodius (Sunday)										
		6 July - Burning at Stake of Jan Hus (Monday)										

## VI. TEACHING SCHEDULE SUMMER SEMESTER 2015

The schedules are subject to change.

Most recent versions are at [https://iweb.cerge-ei.cz/phd/prog\\_details/coursebook/](https://iweb.cerge-ei.cz/phd/prog_details/coursebook/)

A. SUMMER SEMESTER - 1st YEAR STUDENTS					MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
08:30 – 10:00									
10:00 – 10:30			<i>Coffee Break</i>						
10:30 – 12:00	<b>Microeconomics III</b> <i>Michellucci</i> 320	<b>Microeconomics III</b> <i>Michellucci</i> 320							
12:00 – 13:30			<i>Lunch Break</i>						
13:30 – 15:00	<b>ES Microeconomics III</b> <i>Tsintskiladze</i> 320	<b>Macroeconomics III</b> <i>Jeong/Matějka</i> 320	<b>Macroeconomics III</b> <i>Jeong/Matějka</i> 320						
15:00 – 16:30	<b>Econometrics II</b> <i>Mittag</i> 320	<b>Econometrics II</b> <i>Mittag</i> 320				<b>Macroeconomics III</b> <i>Jeong/Matějka</i> 320	<b>Macroeconomics III</b> <i>Jeong/Matějka</i> 320	<b>Research Seminars</b>	
16:30 – 18:00	<b>Research Seminars</b>						<b>Research Seminars</b>		

## VII. TEACHING SCHEDULE PREPARATORY SEMESTER 2015

The schedules are subject to change.

Most recent versions are at [https://iweb.cerge-ei.cz/phd/prog\\_details/coursebook/](https://iweb.cerge-ei.cz/phd/prog_details/coursebook/)

B. PREPARATORY SEMESTER (July 20th – August 28th, 2015)					
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
08:30 – 10:00	Mathematics 0 - tbc Tashpulatov 320	Mathematics 0 - tbc Tashpulatov 320	Mathematics 0 - tbc Tashpulatov 320	Mathematics 0 - tbc Tashpulatov 320	
10:00 – 10:30	Coffee Break				
10:30 – 12:00	Microeconomics 0 Michelucci 320	Microeconomics 0 Michelucci 320			
12:00 – 13:30	Lunch Break				
13:30 – 15:00					
15:00 – 16:30	Macroeconomics 0 Jeong 320			Macroeconomics 0 Jeong 320	
16:30 – 18:00					