CASED

CENTER FOR ADVANCED STUDIES IN ECONOMICS AND DATA SCIENCE

Pre-Master/Pre-PhD in Economics

Center for Advanced Studies in Economics and Data Science

Autumn 2026 – K14

I. Analysis and optimization in finite dimension

- Mathematical Background: Real Sequences, Limits of Real Sequences, n-Dimensional Real Space R^n, Bounds, Interior, Superior, Sequence of Points in R^n
- Topology: Open, Closed and Compact Sets, Matrices, Mappings, Continuous Functions,
- Differentiability of Functions
- Unconstrained Optimization: First-order Conditions, Second order Conditions
- Convex functions: Definitions, Properties, Continuity Theorems
- Convex optimization: Convex Optimization Problem, Separation Theorems, Slater Conditions, Kuhn-Tucker Conditions, Lagrangian of Convex Optimization Problem, Duality in Convex Programming

Instructor: Dr. Nguyen Thi Do Hanh (PhD in Mathematics-Economics, University Paris Panthéon-Sorbonne and Paris School of Economics) – **ngdohanh@gmail.com**

Learning: 03/09, 05/09, 08/09, 10/09, 12/09, 15/09, 17/09, 19/09, 22/09

Review: 08/12

Exam: 13/12

Time: 6.30pm – 9.00 pm (Vietnamese time)

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II. Advanced Microeconomics

- Consumers and Producers: Consumers and Demand, Producers and Supply
- Market Structures: Competitive Market, Monopoly, Oligopoly
- Equilibrium, Economic Efficiency, and Public Regulation: Pareto Optimum and Competitive Equilibrium, Choice Under Uncertainty, and Inefficiency of Competitive Markets, Markets with Asymmetric Information

Instructor: Dr. My Dam (PhD Economics, University of Paris-Saclay, France) - my.dam169@gmail.com

Learning: 24/09, 26/09, 29/09, 01/10, 03/10, 06/10, 08/10, 10/10, 13/10

Review: 22/12

Exam: 27/12

Time: 7.0pm – 9.30 pm (Vietnamese time)

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III. Advanced Macroeconomics

- Some Mathematical tools commonly used (Static convex optimization, Dynamic optimization, dynamical analysis)

- Review of Solow and Augmented Solow growth model

  - Ramsey model
  - Two-period models
  - Overlapping generations model
  - Endogenous growth models
  - Real business cycle model

Instructor: Dr. Tran Quang Thanh (PhD Economics, Tohoku University, Japan) -

tran.quangthanh@depocen.org

Learning: 17/10, 20/10, 22/10, 25/10, 27/10, 29/10, 31/10
Review: 05/01
Exam: 10/01
Time: 6.30pm – 9.30 pm (Vietnamese time)

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IV. Econometrics

- The Linear Regression Model: Foundations and Functional Form (Simple and multiple regression, hypothesis testing, introduction to nonlinearities via logs and polynomials)
- Model Specification, Interpretation, and Joint Hypothesis Testing (Interactions, categorical variables, model comparison, and testing groups of regressors.)
- Regression Diagnostics and Inference with Non-Ideal Data (Multicollinearity, outliers, heteroskedasticity, autocorrelation, and robust solutions.)
- Introduction to Nonlinear Regression Models (Maximum Likelihood Estimation, Binary Response Models (Logit/Probit))
- Addressing Confounding: Matching and Propensity Score Methods (The selection problem, matching on observables, propensity score estimation, and the Conditional Independence Assumption)
- Instrumental Variables and Experiments (Causality with unobserved confounders, the IV solution, 2SLS)
- Panel Data and Fixed Effects Regression

(Textbook: Introductory Econometrics: A Modern Approach (7th ed., 2020) by Wooldridge and Mostly Harmless Econometrics (2008) by Angrist)

Instructor: Dr. Nguyen Anh Tuan (PhD Economics, CNRS, France) -

tuannguyen.ueb@vnu.edu.vn

Learning: 03/11, 07/11, 10/11, 14/11, 17/11, 21/11, 28/11
Review: 19/01
Exam: 24/01
Time: 6.30pm – 9.30 pm (Vietnamese time)

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Detailed Study & Exam Schedule

Subject	Date	Day	Session	Notes
Optimization	03/09	Thursday	Session 1	Course Commencement
Optimization	05/09	Saturday	Session 2	
Optimization	08/09	Tuesday	Session 3	
Optimization	10/09	Thursday	Session 4	
Optimization	12/09	Saturday	Session 5	
Optimization	15/09	Tuesday	Session 6	
Optimization	17/09	Thursday	Session 7	
Optimization	19/09	Saturday	Session 8	
Optimization	22/09	Tuesday	Session 9	End of Module 1 Theory
Microeconomics	24/09	Thursday	Session 1	
Microeconomics	26/09	Saturday	Session 2	
Microeconomics	29/09	Tuesday	Session 3	
Microeconomics	01/10	Thursday	Session 4	
Microeconomics	03/10	Saturday	Session 5	
Microeconomics	06/10	Tuesday	Session 6	
Microeconomics	08/10	Thursday	Session 7	
Microeconomics	10/10	Saturday	Session 8	
Microeconomics	13/10	Tuesday	Session 9	End of Module 2 Theory
Macroeconomics	17/10	Saturday	Session 1	
Macroeconomics	20/10	Tuesday	Session 2	
Macroeconomics	22/10	Thursday	Session 3	
Macroeconomics	25/10	Sunday	Session 4	
Macroeconomics	27/10	Tuesday	Session 5	
Macroeconomics	29/10	Thursday	Session 6	
Macroeconomics	31/10	Thursday	Session 7	End of Module 3 Theory

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Econometrics	03/11	Tuesday	Session 1	
Econometrics	07/11	Saturday	Session 2	
Econometrics	10/11	Tuesday	Session 3	
Econometrics	14/11	Saturday	Session 4	
Econometrics	17/11	Tuesday	Session 5	
Econometrics	21/11	Saturday	Session 6	
Econometrics	28/11	Saturday	Session 7	End of All Theory Sessions
Optimization	08/12	**Tuesday**	**Final Review**	**Review for Module 1**
Optimization	13/12	**Sunday**	**Official Exam**	**Exam for Module 1**
Microeconomics	22/12	**Tuesday**	**Final Review**	**Review for Module 2**
Microeconomics	27/12	**Sunday**	**Official Exam**	**Exam for Module 2**
Macroeconomics	05/01	**Tuesday**	**Final Review**	**Review for Module 3**
Macroeconomics	10/01	**Sunday**	**Official Exam**	**Exam for Module 3**
Econometrics	19/01	**Tuesday**	**Final Review**	**Review for Module 4**
Econometrics	24/01	**Sunday**	**Official Exam**	**Exam for Module 4**

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Buổi số	Thứ	Ngày
01	Thứ Ba	03/11
02	Thứ Bảy	07/11
03	Thứ Ba	10/11
04	Thứ Bảy	14/11
05	Thứ Ba	17/11
06	Thứ Bảy	21/11
Nghỉ - ngày Văn hoá VN	Thứ Ba	24/11
07	Thứ Bảy	28/11
08 – Buổi ôn tập	Thứ Bảy	19/01