GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Advanced Econometrics: Non-Linear Methods (F000687)

Course size *(nominal values; actual values may depend on programme)*

Credits 6.0 **Study time 180 h**

Course offerings and teaching methods in academic year 2025-2026

A (semester 2)	English	Gent	seminar
			group work
			lecture

Lecturers in academic year 2025-2026

Everaert, Gerdie	EB21	lecturer-in-charge
Cockx, Bart	EB21	co-lecturer

Offered in the following programmes in 2025-2026	crdts	offering
Master of Science in Business Engineering(main subject Data Analytics)	6	A
Master of Science in Business Engineering(main subject Operations Management)	6	A
Master of Science in Economics	6	A
Master of Science in Economics (Double Degree)	6	A
Master of Science in Statistical Data Analysis	6	A
Exchange programme in Economics and Business Administration	6	A

Teaching languages

English

Keywords

Asymptotic properties of estimators, simulation methods, endogeneity, instrumental variables, generalised method of moments, panel data, non-linear estimation methods, (quasi-) maximum likelihood, specification issues and hypothesis testing, discrete choice.

Position of the course

To broaden and deepen the knowledge acquired in the courses “Econometrics” and “Econometrics: Time Series Analysis”. Being able to apply the acquired knowledge and abilities by working in small groups on cases.

Contents

- The Classical Linear Regression Model in matrix notation
- Asymptotic properties of estimators
- Simulation methods (Monte Carlo and Bootstrap)
- Endogeneity, instrumental variables and the Generalised Method of Moments (GMM)
- Linear estimation methods for static and dynamic panel data models
- Conditional expectation and partial effects in non-linear models
- The linear projection as approximation of the conditional expectation
- Non-linear estimation methods, among which (quasi-) maximum likelihood
- Specification issues, nested and non-nested tests in non-linear models
- Discrete choice models for cross section and panel data
- Endogenous explanatory variables in non-linear models

Initial competences

Final objectives from the courses “Econometrics” and “Econometrics: Time Series Analysis”.

Final competences

1 Thorough knowledge of the asymptotic properties of estimators, simulation methods, instrumental variables estimators, linear and non-linear estimation methods.
2 Principles of hypothesis testing for nested and non-nested models for parametric non-linear models.
3 Being able to apply the estimation and inference methods to real economic examples and data through computer assignments.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Group work, Seminar, Lecture

Extra information on the teaching methods

Lectures and tutorials (both in English).

Study material

Type: Slides

Name: Slides advanced econometrics
Indicative price: Free or paid by faculty
Optional: no
Language : English

References

- Greene, W.H., Econometric Analysis (fifth edition), Prentice Hall, 2003.
- Johnston, J. and J. Dinardo, Econometric Methods (fourth edition), McGraw-Hill, 1997.
- Verbeek, M., A Guide to Modern Econometrics (fourth edition), John Wiley & Sons, 2012.
- Wooldridge, J.M., Econometric Analysis of Cross Section and Panel Data (second edition), MIT Press, 2010.

Course content-related study coaching

Concerning the content of the course, students can appeal to the support of the lecturer and the assistants. Study material (slides, assignments, solutions to the assignments, ...) are available on Ufora.

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Oral assessment, Written assessment

Examination methods in case of periodic assessment during the second examination period

Oral assessment, Written assessment

Examination methods in case of permanent assessment

Written assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

Written and oral exam.

Calculation of the examination mark

Two parts, each on 10 points.
First part: periodic evaluation
Second part: periodic and non-periodic evaluation
The periodic assessment consists of computer exercises in which the practical implications of the theoretical concepts from the lectures are practiced. In these exercises, students learn step by step how to apply estimation methods to real

data. The exercises are variations of the examples discussed in class. Students work in groups of a maximum of 3. These exercises account for 25% of the points for part 2 (12.5% of the total score).