

## 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 2024-2025**

A (semester 2)

English

Gent

lecture

group work

seminar

**Lecturers in academic year 2024-2025**

Everaert, Gerdie

EB21

lecturer-in-charge

Cockx, Bart

EB21

co-lecturer

**Offered in the following programmes in 2024-2025**

Master of Science in Business Engineering(main subject Data Analytics)

**crdts**

6

**offering**

A

Master of Science in Business Engineering (Double Degree)(main subject Data Analytics)

6

A

Master of Science in Business Engineering (Double Degree)(main subject Operations Management)

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

Oral assessment, Written assessment

## Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

## Extra information on the examination methods

Written and oral exam.

## Calculation of the examination mark

End-of-term.