# Syllabus

for course at first level

**Empirical Methods in Economics IIb**
**Empiriska metoder i nationalekonomin IIb**

**7.5 Higher Education Credits**
**7.5 ECTS credits**

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|---|---|
| **Course code:** | EC2408 |
| **Valid from:** | Spring 2023 |
| **Date of approval:** | 2020-12-03 |
| **Changed:** | 2022-09-01 |
| **Department** | Department of Economics |
| **Main field:** | Economics |
| **Specialisation:** | G1F - First cycle, has less than 60 credits in first-cycle course/s as entry requirements |

## Decision

This syllabus was adopted by the Board of the Department of Economics on September 1, 2022.

## Prerequisites and special admittance requirements

Economics I, 30 credits, or Microeconomic Theory and Applications, 15 credits and Macroeconomic Theory and Applications, 15 credits, and Empirical Methods in Economics I, 7,5 credits, or the equivalent.

## Course structure

| Examination code | Name | Higher Education Credits |
|---|---|---|
| 241A | Termpaper | 5 |
| 241B | Assignments | 2 |
| 241C | Oral examination | 0.5 |

## Course content

The course aims to provide students with a deeper understanding of the statistical methods used in the empirical analysis of economic problems involving time-series data. The course includes the following methods: OLS with time-series data, auto-correlation, deterministic trend, seasonality, structural breaks, robust inference for heteroscedasticity and autocorrelation; ARMA models, stationarity and stochastic trend; unit roots test, stationarity tests, autoregressive models; maximum-likelihood estimation; information criteria and moving-average models; SARIMA models, VAR models, co-integration and error-correction models; forecasting, forecast evaluation and Granger causality. The course includes an introduction to R and reproducible econometrics.

## Learning outcomes

Upon completion of the course, students are expected to be able to:

* remove trend and seasonality from time-series data, with and without structural breaks;

* perform unit roots/stationarity tests and, using appropriate variable transformation, make data stationary;

* estimate a time-series model using OLS and perform hypothesis tests (t and F tests) with robust inference;

* identify, estimate, and diagnose ARIMA and bivariate VAR models;

* test for co-integration in a bivariate model and estimate and analyse error-correction models;

* produce and evaluate forecasts using the models discussed in the course; and

* use the econometrics program R to create reproducible econometrics.

**Education**

Lectures and exercises. The term paper is discussed at a pre-seminar before final submission. The language of instruction is English.

**Forms of examination**

Assignments are solved in groups of 1–3 students, oral presentation of the own term paper's question, data and methods at a pre-seminar and to individually write a term paper with a self-selected question, the purpose of which is to analyze the econometric methods reviewed during the course.

Assignments comprising 2 higher education credits are carried out in groups and are examined with the grades fail (U) or pass (G). For G, all submissions must be approved.

Oral discussion of another student's term paper draft in pre-seminar comprising 0.5 higher education credits is carried out individually and examined with the grades fail (U) or pass (G). For G, the discussion must be completed and approved.

A term paper worth 5 higher education credits is written individually and examined according to a seven-point scale related to the learning objectives of the course: Passing grades are A, B, C, D, and E, where A is the highest grade and E the lowest. Failing grades are F and FX, where F is lower than FX.

Grading criteria (regression analysis below refers to the different regression methods that are listed under the section Course content):

* A (Excellent): The student is able to independently carry out an empirical project using regression analysis and interpret the results from an independently identified research question. In addition, the student is able to discuss the strengths and problems of regression analysis, as well as clearly connect the research question to the empirical analysis.

* B (Very Good): The student is able to independently carry out an empirical project using regression analysis and interpret the results. In addition, the student is able to discuss the strengths and problems of regression analysis, as well as demonstrate a clear connection between the research question and the empirical analysis.

* C (Good): The student is able to independently carry out an empirical project using regression analysis and interpret the results. The student demonstrates an understanding of the strengths and problems of regression analysis.

* D (Satisfactory): The student is able to independently carry out an empirical project using regression analysis and interpret the results.

* E (Adequate): The student is able to carry out an empirical project using regression analysis and somewhat accurately interpret the results.

* FX (Inadequate): The student has fulfilled the requirements for E, but has failed to meet requests for clarification or revision of the course paper.

* F (Totally Inadequate): The student has not fulfilled the requirements for E.

Provisions for the final course grade:

* if a student has passed all written assignments and the review of a term paper, the final course grade is determined by the grade on the term paper;

* if a student has failed any written assignments or the review of a term paper, the final course grade is F, regardless of the grade on the term paper.

If a student receives the grade FX or F on an examination, there are no restrictions on how many times they

are allowed to retake the examination in order to obtain a grade of E or higher.

**Interim**

If the course is discontinued, students have the right to be examined on the course once per semester for three further semesters.

**Limitations**

This course may not be included in a degree together with EC2405 Empirical Methods in Economics 3 (7.5 ECTS credits).

**Required reading**

* James H. Stock & Mark M. Watson, Introduction to econometrics, Pearson education, latest edition.
* Articles.
* Lecture notes