**International Economics
Development Economics**

Academic year 2020-2021

Mathematics and Statistics for Economists

EI071 - Autumn - 6 ECTS

> **ASSISTANT**

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Office hours

Course Description

The aim of the course is to give the incoming Master students in Economics the necessary mathematical and statistical skills to begin the core first-year courses. We will go over basic matrix algebra, analysis, optimisation, probability and statistics. An introduction to the different software needed, such as LaTeX and Stata, will also be given. This four-week course consists of daily lectures and problem-solving sessions designed to bring students from heterogeneous academic backgrounds up to speed in terms of the quantitative methods used in economics.

Syllabus

Pre-requisites

The material covered is at an intermediate bachelor-master level. A basic undergraduate knowledge of mathematics and statistics is of course needed, but the purpose of the course is also to refresh this knowledge, in particular for students who graduated a few years ago.

Grading

Please note that a pass/fail grading system will apply for this course. It will be mostly based on your participation in the course but also on a final examination. Some individual and/or group work will also be involved. Students who will not be able to attend the entire course should contact the assistant as soon as possible.

Content of the course

1) Linear Algebra

- System of linear equations
- Operations on matrices
- Some specific matrices
- Determinant, rank and inverse of a matrix
- Eigenvalues, eigenvectors
- Kroenecker product

2) Mathematical analysis

- Differentiation
- Partial and total differentiation
- Implicit differentiation (univariate and multivariate)
- Approximation
- Log-linearization

3) Optimisation

- Unconstrained optimisation
- Static optimisation under constraints
- Dynamic optimisation in discrete time
- Dynamic optimisation in continuous time

4) Probability and statistics

- Basic probability theory
- Random variables
- Common distributions
- Random samples and limit theorems
- Hypothesis testing

References

- Anton, H. (1987): Elementary Linear Algebra
- Glaister, S. (1984): Mathematical methods for economists
- Leonard, S. (2015): An Introductory Guide to Macroeconomic Theory
- Pemberton, M. and Rau, N. (2016): Mathematics for economists: An introductory textbook
- Sydsaeter K. Hammond P. and Strom A. (2012): Essential Mathematics for economic analysis