Syllabus

1. Course Description
    a. Title of a Course: **TIME SERIES ANALYSIS**
    b. Pre-requisites: Statistics, Econometrics, the knowledge of economic theory and computer-based information systems is necessary as well.
    c. Course Type: Elective
    d. Abstract: Time Series Analysis (Master level) is an elective course designed for the first year Master students of "Finantial Analytic" Program. This is an intermediate course of Time Series Theory for the students specializing in the field of Finance and Banking. The course is taught in English.The stress in the course is made on the sense of facts and methods of time series analysis. Conclusions and proofs are given for some basic formulas and models; this enables the students to understand the principles of economic theory. The main stress is made on the economic interpretation and applications of considered economic models.

2. Learning objectives:

The students should get acquainted with the main concepts of Time Series theory and methods of analysis. They should know how to use them in examining financial processes and should understand methods, ideas, results and conclusions that can be met in the majority of books and articles on economics and finance. In this course, students should master traditional methods of Time Series analysis, intended mainly for working with time series data. Students should understand the differences between cross-sections and time series, and those specific economic problems, which occur while working with data of these types.

3. Learning outcomes

Students should become skillful in analysis and modelling of stochastic processes of *ARMA* (*p*, *d*, *q*) models, get acquainted with co-integration and error correction models, autoregressive models with distributed lags, understand their application in economics. Considered methods and models should be mastered by practice using real economic data and modern economic software Econometric views and R.

4. Course Plan

No	Topics titles	TOTAL (hours)	Contact hours i. e.		Hours without assistance
			Lectures	Classes	
1	Stochastic process and its main characteristics	14	2	2	10
2	Autoregressive-moving average models ARMA (p,q). Estimation of coefficients of ARMA (p,q) processes. Box-Jenkins' approach	14	2	2	10
3	Forecasting in Box-Jenkins model	14	2	2	10
4	Non-stationary time series	14	2	2	10
5	Unit root problems. Unit root and structure changes	14	2	2	10
6	Regressive dynamic models	14	2	2	10
7	Vector autoregressive model and co-integration	12	2		10
8	Causality in time series	10	2		8
	Final exam	**2**			**2**
	Total:	**108**	**16**	**12**	**80**

5. Reading list

a. Required:

- Enders W. Applied Econometric Time Series. John Wiley & Sons. 2010.
- Tsay R. S. Analysis of financial time series. John Wiley & Sons. 2010.

a. Optional:

- Mills T.C. The Econometric Modelling of Financial Time Series. Cambridge University Press, 2004
- Banerjee A. Co-Integration, Error Correction, and Econometric Analysis of Non-Stationary Data. Oxford University Press. 2003.
- Banerjee A. Co-Integration, Error Correction, and Econometric Analysis of Non-Stationary Data. Oxford University Press. 1993. (e-book).

6. Grading system

Students' performance is evaluated on a 10-point mark scale as follows:

Points	Description
10	Distinguished performance
8-9	Excellent performance
6-7	Good performance
4-5	Satisfactory performance
0-3	Fail

The rounding of the definitive performance grade is conducted in accordance with the standard mathematical rounding rules. The rounding of the intermediate grades is not conducted to avoid the rounding bias.

7. Guidelines for Knowledge Assessment

It is assumed that lectures and seminars are attended. The main form of control is the examination at the end of the course. Before the exam students have to present econometric research based on data gathered under the supervision of the teacher.
To get a good mark in the exam students have to show absolute knowledge of the bases of the course, hand in all home assignments and well written examination research. This course includes 1 control work. The main form of control is the written exam. Necessary conditions for a good exam grade are well-done control work (40% of the final grade). The exam work gives 60% of the final grade.

8. Methods of Instruction

The instructors use traditional methods of instruction by providing well-structured reading during contact hours with a lot of illustrations, problems and real case studies and discussing the materials.

9. Special equipment and software support

Not required.