Detailed course description for instructors
(optional elements are in green)

I. Basic data

Course code:	TBD
Course title:	Empirical Financial Econometrics
Number of contact hours:	3 seminars/day in the intensive week
Number of credits:	3
Estimated student workload (in academic hours):	*12*
Fall/Spring:	Spring semester (intensive week)
Language of education:	**English**
Prerequisites:	**For MA/MSc students: Statistics and Econometrics**
Course type:	**Master level – free elective**
Department:	**MNB Tanszék**
Course leader:	**Chen Chaoyi**
Course instructor:	**Chen Chaoyi**
Time of class:	intensive week

II. Aims of the course:

This course is designed for Master's students interested in Finance and/or Econometrics. The main focus will be on financial econometrics, the modeling of conditional volatilities and their application to financial data. Following a review of linear time series models, we will begin this segment by presenting the stylized facts that motivates this literature. Then we proceed to study the econometric approaches that have been developed to model this phenomenon, including the Generalized Autoregressive Conditional Heteroskedastic (GARCH) model and its generalized forms.

Session	Topics
1	Introduction to mean-variance portfolio selection
2	Stationary ARMA modeling and forecasting
3	Non-Stationary modeling, testing and forecasting
4	Constructing of out-of-sample forecasts
5	Testing the accuracy of out-of-sample forecasts
6	Models Diagnostics and selection for ARMA models
7	Stylized facts for asset returns
8	Autoregressive conditional heteroskedasticity (ARCH) and generalized ARCH (GARCH) models
9	Univariate generalizations of GARCH, including the ARCH-M, IGARCH, TARCH, and EGARCH models
10	Models Diagnostics and selection for GARCH-type models
11	Dynamic mean-variance portfolio selection
12	Q&A and mini presentations

III. Connections with other courses:

Students are expected to be familiar with statistics and econometrics at the introductory level (e.g. Stock and Watson, Wooldridge's undergraduate textbooks), matrix algebra, common distributions and basic probability theory, and be able to code in MATLAB/Octave. However, students with no prior

coding experience are also welcomed to take the course. But they will be expected to learn the basics of MATLAB/Octave before the course starts (code and references will be provided).

IV. Intended Learning outcomes of the course

Knowledge	Skills	Attitudes	Autonomy & Responsibility
Understand core concepts in financial time series and its application to financial data.	Students will be able to apply various financial econometric methods to real financial data and construct their dynamic portfolio.	Apply an evidence and data based approach to knowledge and understanding.	

V. Planned learning activities of students for supporting the achievement of intended learning outcomes.

Learning activities of students	Learning activities of students participating in dual studies (only for dual courses)	Estimated student workload (in academic hours) for the given learning activity	Intended learning outcomes supported by the given activity	Learning management considerations for the given learning activity	Special administration tasks
Active participation in seminars through questions and comments, reading book sections and articles ahead of classes. Students are required to work on a small portfolio selection project, whose results are going to be presented in the last session.		12 hours			

VI. Evaluation system of the course (in case of a dual course the system of evaluation of activities performed by of students participating in dual studies should also be discussed)

Minimum requirement:

Students are going to demonstrate their understanding of forecasting and portfolio selection techniques by presenting the results of a simple **empirical** project in no more than 10 minutes in the last session. Participants are expected to work in small groups (whose size depends on the class size, TBD).

Grading:
0-50 fail (F), 51-60 sufficient (D), 61-70 satisfactory (C), 71-80 good (B), 81-100 excellent (A).

VII. Compulsory literature
A list with references to journal articles will be distributed at the beginning of the course, along with corresponding textbook chapters if necessary. Lecture slides will be provided, and students are expected to familiarize themselves with those materials.

VIII. Recommended literature
There is **no** required textbook for this course. Special chapters or sections from several of the books listed below are included in the reading list and all of these books are valuable references. However, you do not need to purchase them as you can borrow books from the library on short-term reserve. Of these books, the reading list draws most heavily from Campbell *et al.* (1997), Cochrane (2001), and Enders (2004).

- Campbell, John Y., Andrew W. Lo and Craig MacKinlay (1997). *The Econometrics of Financial Markets*. Princeton University Press.
- Cochrane, John H. (2001). *Asset Pricing*. Princeton University Press.
- Cuthbertson, Keith and Dirk Nitzsche (2004). *Quantitative Financial Economics: Stocks, Bonds, & Foreign Exchange*. 2nd ed.. John Wiley & Sons.
- Elton, Edwin J., Martin J. Gruber, Stephen J. Brown and William N. Goetzmann (2003). *Modern Portfolio Theory and Investment Analysis*. 6th ed.. John Wiley and Sons.
- Enders, Walter (2004). *Applied Econometric Time Series*. Wiley Series in Probability and Statistics. 2nd ed.. Wiley.