Course description
Machine Learning in Economics
MSc in Economic Analysis at Corvinus University of Budapest

I. Basic data

Course code:	KG00076NAMB, KG00078NMMB
Course title:	Machine Learning in Economics
Number of contact hours:	6 x 2 x 90 minutes
Number of credits:	5
Fall/Spring:	second year of the program
Language of education:	English
Prerequisites:	Econometrics and (Time Series Analysis or Causal Data Analysis)
Course type:	Compulsory elective
Department:	Institute of Economics
Course instructor:	Péter Elek (Senior Ressearch Fellow at KRTK and Associate professor at BCE)

II. Aims of the course:

The aim of the course is to acquaint students with the machine learning-based methods of forecasting and causal analysis, as well as their economic applications. After the course, the students will be able to fit various machine learning models with the R software, evaluate their forecasting performance, and communicate results using data visualization and other techniques.

III. Connections with other courses:

The course builds on the compulsory base subject Econometrics and some parts of the advanced econometric subjects of the two specializations (Causal Data Analysis and Time Series Analysis). Later, students will make use of the knowledge gained here during the preparation of their dissertation and in their jobs after graduation.

IV. Evaluation system of the course

Exam: 60%
Home assignments: 20%
Empirical analysis: 20%

V. Compulsory literature

Békés G., Kézdi G. 2021. Data Analysis for Business, Economics and Policy. Cambridge University Press. Chapters 13-17.
James G, Witten D, Hastie T, Tibshirani R. 2013. An Introduction to Statistical Learning with Applications in R. Springer. selected chapters
Additional slides and papers (mainly for the last topic)

VI. Recommended literature

Hastie T, Tibshirani R, Friedman J. 2009. The Elements of Statistical Learning. Springer. 2nd edition. selected chapters

VII. Schedule:

1. Review and basics of prediction: review of regression, bias-variance tradeoff, overfitting, information criteria, regularisation, validation, cross-validation, role of machine learning
2. LASSO and ridge regression
3. Regression trees
4. Random forests and boosting
5. Classification
6. Treatment effect estimation: causal forests