Course Descriptions NonDegree 2016-2017

Course Title	High-Dimensional Econometric Methods for Big Data
Course Code	EBC4218
ECTS Credits	6,5
Assessment	Whole/Half Grades

Period

Period	Start	End	Mon	Tue	Wed	Thu	Fri
2	31-10-2016	22-12-2016	C				

Level	Advanced
Coordinator	Stephan Smeekes For more information:s.smeekes@maastrichtuniversity.nl
Language of instruction	English
Goals	The objective of this course is to provide students with an understanding of modern and advanced econometric techniques for the analysis of high-dimensional data. Students will be able to read and understand theoretical papers on the subject, to implement the techniques themselves in statistical software, and to apply the techniques to data used in economics and business. In addition to gaining this knowledge they will develop the skills to assess such methods critically and consequently adapt them to suit their needs.
Description	In this course we cover several advanced techniques that have recently been developed in econometrics and statistics for the analysis of high-dimensional problems, which often arise in the context of Big Data. We will discuss theoretical properties of the methods, their practical implementation using the statistical programming language R and the application of these methods to real-life economic and financial datasets. Topics that are covered include: •Estimation, inference and forecasting in common factor models •Linear regression with many regressors: model selection (information criteria, cross-validation) and penalized regression (lasso and variants) •Inference in high-dimensional regression models: post-model selection inference, model averaging, multiple hypothesis testing, construction of 'honest' confidence intervals •Introduction to machine learning techniques for use in econometrics, with applications to high-dimensional discrete choice models The course will consist of lectures, in which the methods and theory are introduced, and tutorials, in which groups of students present specific papers on the subject. Students also have to write a paper for which they implement and apply the methods to economic problems.
Literature	•Hastie, T., R. Tibshirani and J. Friedman (2009). The Elements of Statistical Learning: Data Mining, Inference, and Prediction (2nd Ed). Freely available at http://statweb.stanford.edu/~tibs/ElemStatLearn/ •Selected papers and book chapters (to be announced on Canvas)
Prerequisites	Students need to have solid background in probability theory, mathematical statistics, econometric methods and time series analysis, comparable to the knowledge obtained during the econometric courses of the bachelor programme Econometrics and Operations Research. In addition, students are advised to have followed (or follow in parallel) the course Time Series Analysis and Dynamic Econometrics.
Keywords	
Teaching methods	PBL / Presentation / Lecture / Groupwork
Assessment methods	Final Paper / Participation / Written Exam
Evaluation in previous academic year	For the complete evaluation of this course please click http://iwio-sbe.maastrichtuniversity.nl/rapporten.asp?referrer=codeUM

This course belongs to the following programme / specialisation

Master Business Research	Free Electives
Master Business Research Track OR	Free Electives
Master Econometrics and OR	Econometrics & OR Electives
Master Economic and Financial Research Track Econometrics	Electives
Master Economic and Financial Research	Electives
SBE Exchange Master	Master Exchange Courses
SBE Non Degree Courses	Master Courses