

QUANTITATIVE ANALYSIS FOR MANAGERIAL DECISIONS

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PROFESSOR:.
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Description

We are at the eve of a new industrial revolution that will be based on information and new technology. Key in this revolution will be the use of data, analytics, machine learning and mathematical modeling. This course aims to provide insight in these developments but it also aims to provide students tools that will help them to be more successful in a corporate environment.

Specific objectives are:

- know the basics of statistics and data manipulations
- know at least one analytical tool (R)
- know the limitations and possibilities of models, tools and visualizations
- understand the importance data in decision-making
- understand when what method can be used and what their limitations are
- understand the limitations of methods and models
- apply this knowledge to
 - mine data
 - make informed decisions based on data and facts
 - identify opportunities of improvement
- make a project: identify the issue, get data, select a method, do the maths and finally present the result.

Design

PART I: Theory

1. Introduction: economic cycles and the technology of the future
2. Introduction to modelling with R
 - a) the basics of programming in R
 - b) levels of measurement
 - c) selected notions of statistics
 - a) levels of measurement
 - b) measures of central tendency
 - c) measures of variation and spread
 - d) measures of covariation
 - e) regression models
 - f) model performance
 - g) distributions
 - h) anova
 - i) time series analysis
 - j) decision trees
 - k) random forest

- l) chi square tests
- m) bootstrapping
- 3. Valuation of financial assets and companies
- 4. Multi Criteria Decision Analysis

PART II: Practice

- 1. Guided modeling exercises (preparation for the final presentation)
- 2. Guest speakers from different companies that bring each a specific topic, models and eventually data so students can try the methods learned)
- 3. project (“selected assignment”)
 - 1. preparation of a “board paper” (showing that the student is able to work with data and communicate about it)
 - 2. presentation of the results

Materials

- 1. the book “Introduction to statistics and data mining with R”
- 2. the book “Valuation of Financial Assets and companies”
- 3. the book “Multiple Criteria Decision Analysis”
- 4. code snippets
- 5. links to papers and articles

Tools

the software R: see <https://www.r-project.org/> or download eg. from <https://cran.uni-muenster.de/>

Grading

- 10% presence in classroom
- 40% collaboration in classroom
- 50% selected assignment

The Selected Assignment (“project”)

A project can be an individual work or a group work (a “group” is one to 4 persons), that uses at least one of the methods learned. The project aims to practice the methods learned, formulate hypotheses, test them and present the results in a convincing way.

During the last lesson each project can be presented in a “15 minutes elevator pitch”. Elevator pitch presentations are assessed as follows

- 40% for the idea and its viability
- 30% for the logical structure of the presentation
- 30% for the presentation itself (quality of slides if used + oratorical qualities)