

30E03500 – Data Science for Business II (6cr)

Syllabus

Instructors' contact information	Course information
Names: Pekka Malo, Eeva Vilkkumaa Teaching Assistants: Anton Frantsev, Lauri Neuvonen E-mail: firstname.surname@aalto.fi Office: CG-4.18 Instructors' webpages: https://people.aalto.fi/pekka_malo https://people.aalto.fi/eeva_vilkkumaa	Status of the course: Master's degree program in Information and Service Management. Business application course in the Aalto level module on Analytics and Data Science. Academic Year, Period: 2017-2018, Period IV Location: Töölö, C-332 Language of Instruction: English Course Website: https://mycourses.aalto.fi/course/view.php?id=16346

1. Overview

“From Data to Decisions – What You Need to Know About Data-driven Decision Making”

The course focus is on bridging the gap between predictive and prescriptive modelling. This will entail combining probabilistic modelling approaches with modern optimization techniques and decision-analytic tools. In terms of content, the course consists of two parts. In the first part, the students will learn methods and theory (e.g., optimization concepts and fundamentals of statistical learning theory) needed for prescriptive modelling. The material will involve programming assignments with practical applications. The second part will feature applications in the form of visiting lecturers, who come from different industries (e.g., financial analytics, sports analytics).

2. Target group and prerequisites

The course is intended for participants with diverse backgrounds:

- Business analysts and developers who will be implementing and evaluating data science solutions;
- Business people who will be working with data scientists, managing data science -oriented projects, or investing in data-driven ventures.

As a prerequisite for enrolling to this course, we assume that you have completed Data Science for Business I (or a similar course). The course has a strong focus on empirical assignments, which requires prior knowledge in the following topics:

- Fundamentals in statistics (e.g., 30A02000 or preferably 30C00600)
- Knowledge in business mathematics; in particular, linear algebra and optimization (e.g., 30A03000 or preferably 30C00355)
- Basic skills in programming/scripting (e.g., R, Python, Scala / Java)

3. Learning outcomes

After completing the course, the students will

- understand the importance of prescriptive analytics in business decision-making,
- be able to combine predictive modeling approaches with optimization techniques to build prescriptive analytics solutions,
- be able to implement (program) their solutions with suitable software.

4. Assessment, assignments, and grading

The course assessment is comprised of the following two parts:

- Class activity (lectures, tutorials, exercises) 30%
- Team case (course project) 70%

All assignments must be completed to pass the course, and late assignments will not be accepted. Note that the starting level of the student teams will be taken into account in the grading of group assignments and the team case, and thus special attention is paid to the teams' development in knowledge sharing and learning.

5. Readings

All materials needed for completing the course are provided during the lectures and assignment / lab sessions. The following list of complementary reading is recommended but not required.

Complementary readings:

- James, G., Witten, D., Hastie, T., and Tibshirani, R. (2013) "An Introduction to Statistical Learning: with Applications in R." Springer Texts in Statistics.
- Anderson, D., Sweeney, D., and Williams, T. (2000) "An Introduction to Management Science: Quantitative Approaches to Decision Making."

6. Preliminary schedule

Week	Dates	Topic
0	13.2. – 15.2.2018	<p>Pre-assignments</p> <p>Read the team case descriptions and send your preference information to the course staff. Notice that not everyone will get their preferred choice as we have to balance the case groups.</p>

Week	Dates	Topic
1	19.2. – 21.2.2018 Mon 15:15-18:00 Tue 15:15-18:00 Wed 15:15-18:00 <hr/> Session legend: Compulsory Not compulsory Extra if needed	Short recap on predictive modeling Lecture (Mon) : <ul style="list-style-type: none"> • Fundamental concepts and definitions Lab / tutorial (Tue): <ul style="list-style-type: none"> • Introduction to R • Recap on predictive modeling Assignment session (Wed): <ul style="list-style-type: none"> • Modeling assignment 1
2	26.2. – 28.2.2018 Mon 15:15-18:00 Tue 15:15-18:00 Wed 15:15-18:00	Introduction to prescriptive modeling Lecture: <ul style="list-style-type: none"> • Introduction to optimization tools • Learning to utilize optimization to support decision-making • Formulation of optimization problems Lab / tutorial: <ul style="list-style-type: none"> • Getting familiar with Ipsolve API • First cup of prescriptive modeling Assignment session: <ul style="list-style-type: none"> • Modeling assignment 2
3	5.3. – 7.3.2018 Mon 15:15-18:00 Tue 15:15-18:00 Wed 15:15-18:00	Case: Prescriptive analytics in finance Lecture: <ul style="list-style-type: none"> • Nordic Investment Bank (Simo Heliövaara) • All: Take-home questionnaire • Finance case groups: start preparing team case Lab / tutorial: <ul style="list-style-type: none"> • Case-related guidance No assignment session
4	12.3. – 14.3.2018 Mon 15:15-18:00 Tue 15:15-18:00 Wed 15:15-18:00	Case: Sports analytics Lecture: <ul style="list-style-type: none"> • SportIQ (Jirka Poropudas) • All: Take-home questionnaire • Finance case groups: start preparing team case Lab / tutorial: <ul style="list-style-type: none"> • Case-related guidance No assignment session

Week	Dates	Topic
5	19.3. – 21.3.2018 Mon 15:15-18:00 Tue 15:15-18:00 Wed 15:15-18:00	Visiting lecture: From Data to Business Opportunities Lecture: <ul style="list-style-type: none"> • Avaamo Konsultointi (Jyrki Koskinen) • Take-home questionnaire Lab / tutorial & Assignment session: <ul style="list-style-type: none"> • The sessions are reserved for preparing the team cases
6	26.3. – 28.3.2018 Mon 15:15-18:00 Tue 15:15-18:00 Wed 15:15-18:00	Team Case Presentations Assignment(s): <ul style="list-style-type: none"> • All: submit presentation slides (DL 26.3.) • Finance teams submit final report (DL 13.4.) • Sport teams submit final report (DL 20.4.) NB! Attendance is compulsory only in the session designated to your team.

7. Course workload

The following is a tentative breakdown of the workload of the course. All hours are academic hours.

Contact sessions	
• Lectures and tutorials (1-2 × 3h / week)	18h
• Exercise demos and workshops (2 × 3h / week)	36h
Class preparation	12h
Assignments	48h
Course project	46h
Total	160h (6op)

8. Ethical rules

Aalto University Code of Academic Integrity and Handling Thereof:

<https://into.aalto.fi/pages/viewpage.action?pageId=3772443>

9. Other issues

- Registration to the course via WebOodi
- Students will be divided into working teams by the teachers in charge
- Evaluation rubrics will be available in MyCourses