

## Capita selecta

### Data Driven Decision Models

<b>Date:</b>	<b>11 &amp; 18 September 2019</b>
<b>Time:</b>	<b>10.00 – 16.00 h.</b>
<b>Location:</b>	<b>Utrecht</b>
<b>Course leader:</b>	<b>Prof. Vidyadhar Kulkarni</b>
<b>Days:</b>	<b>2</b>
<b>ECTS:</b>	<b>0.5 (participating only) - 2 (participating + assignment)</b>
<b>Course fee:</b>	<b>free for TRAIL/Beta/OML members, others please contact the TRAIL office</b>
<b>Registration:</b>	<b><a href="http://www.gpoml.nl">www.gpoml.nl</a></b>

#### Objectives

To train the students in the use of data driven procedures in real life problems.

#### Course description

This course will study decision models in the presence of data. A typical decision model involves optimizing an objective function (such as expected profit, loss, error probabilities, etc.) subject to constraints that must be satisfied by the decision variables. It also includes parameters that have to be estimated from the observed data. The objective function is typically produced by a stochastic model of the system. The parameter estimation is done using statistical procedures. An optimization algorithm is used to produce the optimum decisions.

The recent trend is to merge these three stages into a single integrated entity that we call data driven decision model. Such a model uses a range of statistical procedures from classical statistical procedures (maximum likelihood, for example) to modern ones, (machine learning, for example). It exploits the interplay between the three stages to obtain superior solutions.

This course will study several decision models from the business world to see how the state of the art is changing in the age of data mining and machine learning. Specifically, we shall study data driven decision models in

1. Inventory systems,
2. Offer optimization,
3. Staffing in Service Systems,
4. Revenue Management and Dynamic Pricing, and
5. Medical Decisions.

#### Assignment

There will be two homework assignments, based on the material based on each of the two days.

#### Course material

There is no textbook for this course.

The lecture notes are available at: <http://vkulkarn.web.unc.edu/files/2018/10/alltextDDDM.pdf>