

# ODIN Spring Courses 2012



data • information • control

## Week 11, March 13<sup>th</sup> & 14<sup>th</sup>: Design of experiments

**Background:** Proper analysis of data and efficient planning of experiment is (or should be!) a part of every scientist's toolbox. In this short course, an outline of different terms within Design of experiments and the theory behind when to use what are given. After a reminder on the basics of statistics and populations required for experimental planning (sampling, univariate linear regression, etc.) we will look at the setup and analysis of designed experiments and statistical inference from designed data (Designs, ANOVA, etc.). Furthermore we will discuss efficient planning and performance of fixed pattern and sequential optimizations techniques useful in e.g. yield optimization in production processes or instrumental optimization in analytical chemistry procedures.

**Audience:** The course is intended for people handling problems where using Design of experiments can be an advantage when setting up the experiments or people who have general interest in knowing how to setup and use experimental designs. Simple mathematical and statistical terms will be used in the course and the theory will be accompanied by computer exercises.

**Teacher:** Frans van den Berg

Lunch and coffee will be served. If you have special dietary needs, please let us know by enrollment. Lectures and notes are in English. This ODIN course is limited to two persons per membership.

Enroll to Birger Pedersen ([Bpe@life.ku.dk](mailto:Bpe@life.ku.dk)) 2<sup>nd</sup> March (Week 9) at the latest. Enrollment will be accepted only through your ODIN representative. Please provide e-mail address so last minute details can be provided. Cancellations must be made no later than *four* days in advance or a fee of 500 DKK will be charged.

## **Week 12, March 21st:**

### **Chemometric workshop: come and get your data massaged**

**Background:** This is a new one day course that goes in to depth with chemometrics and the problems you face when using chemometrics in real-world applications.

Most of the time will be spend on looking at examples of data problems provided by the participants. Each participant will have to bring a specific example including data. They will present their data in one-three slides and present the questions/issues they have. This could be how to do variable selection; how to assess if the model is reasonable; how to choose the number of components; how to figure out what approach to use etc. etc. After the presentation, the instructor will analyze the data and provide ideas on how to solve the problem.

As participant you will gain knowledge about chemometric tools such as variable selection, validation, classification etc. The list of subjects, though, is partly controlled by the participants and the problems you bring. Note that it is anticipated that a fair part of the data analysis will be performed in MATLAB because it offers the most possibilities.

There will be a limited number of theoretical presentations but most of the theory will be presented during the analysis of the real-world problems. Hence, this course is less structured than usual ODIN courses.

**Audience:** The course is (only) intended for participants that have significant experience with basic chemometric tools such as PLS and PCA. It is not assumed that the participants know MATLAB. Each participant will have to send data well before the course in a format that can be imported in to MATLAB or Excel.

**Teacher:** Rasmus Bro

Lunch and coffee will be served. If you have special dietary needs, please let us know by enrollment. Lectures and notes are in English. This ODIN course is limited to two persons per membership.

Enroll to Birger Pedersen ([Bpe@life.ku.dk](mailto:Bpe@life.ku.dk)) March 6th at the latest.

Enrollment will be accepted only through your ODIN representative. Please provide e-mail address so last minute details can be provided. Cancellations must be made no later than *four* days in advance or a fee of 500 DKK will be charged.

## **Week 16, April 17th & 18th: Basic Chemometrics**

### **Background:**

Chemometrics (or multivariate data analysis) can be used to solve problems involving large amounts of data. This is relevant within fields such as development, research, process-monitoring and control and laboratory analysis. In these fields the use of single variables is often inadequate to describe, differentiate or classify objects/samples. Looking at more variables at a time ensures that interactions, patterns and correlations are taken into consideration. Combined with superior data visualization makes chemometrics a needed tool for proper data analysis.

As participant you will be introduced to the multivariate way of thinking and learn how to explore your data properly and how to set up a multivariate calibration/regression model. The course is a mixture of lectures and exercises. In the exercises you will use the chemometrics tools and from this be able to navigate through the raw data to interpretation of model parameters on your own.

**Audience:** The course is intended for people handling problems where chemometrics can be applied or people who have general interest in learning more about chemometrics and its applications. Some mathematical and statistical expressions will be used in the course and a variety of data (e.g. sensory and spectroscopic data) will be used as examples. Teaching material in English will be handed out at the course and consists of slides. Please note that the exercises will be performed in groups of two. Lectures will be in Danish or English (if foreigners are present).

**Teachers:** Thomas Skov and Morten A. Rasmussen

Lunch and coffee will be served. If you have special dietary needs, please let us know by enrollment. Lectures and notes are in English. This ODIN course is limited to two persons per membership.

Enroll to Birger Pedersen ([Bpe@life.ku.dk](mailto:Bpe@life.ku.dk)) April 4th at the latest. Enrollment will be accepted only through your ODIN representative. Please provide e-mail address so last minute details can be provided. Cancellations must be made no later than four days in advance or a fee of 500 DKK will be charged.