

# ODIN Spring Courses 2010



## Week 5, February 1st & 2nd: Basic Chemometrics

### Background:

Chemometrics 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.

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 Hjort Skov**

Lunch and coffee will be included. This ODIN course is limited to two persons per membership.

Enroll to Birger Pedersen (Bpe@life.ku.dk) January 18th 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 three days in advance or a fee of 500 DKK will be charged.

### New course:

## Week 5, February 3rd & 4th: Introduction to Design of experiments

### Background:

Design of experiments is a rational and cost-effective approach to practical experimentation that allows the effect of variables to be assessed using a minimum of resources. Discover how to optimize your company's experiments, products and processes for increased throughput and enhanced profitability.

Audience: This course is an introduction to Design of experiments and is intended for people interested in learning the basic idea and analysis steps behind Design of experiments. There is no need for a statistical background and only very simple mathematical and statistical terms will be used in the course. In the course there will be computer exercises to complement the theory.

**Teacher: Gitte Holm (Umetrics)**

Lunch and coffee will be included. 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)) 20th January (Week 5) 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 three days in advance or a fee of 500 DKK will be charged.

## **Week 11, March 16<sup>th</sup> & 17<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 included. 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 11) 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 three days in advance or a fee of 500 DKK will be charged.

## **Week 12, March 23<sup>rd</sup> & 24<sup>th</sup>: Advanced Chemometrics, case studies**

**Background:** This is a new two-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 also be access to SIMCA and Unscrambler.

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 participant knows MATLAB.

**Teacher:** Rasmus Bro

Lunch and coffee will be included. 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 16th 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 three days in advance or a fee of 500 DKK will be charged.

## **Week 15, April 14<sup>th</sup>: Process spectroscopy/chromatography workshop**

**Background:** Fast, sensitive and robust analytical measurements are increasingly required in industry to monitor progress of a reaction, know when the end-point of a process has been reached, check reaction kinetics, detect impurities or control blending, granulation, etc. These activities and many more require timely qualitative and quantitative information. This can often be provided through at-line, on-line, in-line or non-invasive application of chromatographic and/or spectroscopy techniques.

This workshop provides a series of presentations from both Q&T and ODIN partners on process chromatography and spectroscopy techniques, including GC, HPLC, NIR, Hyperspectral NIR, IR, Raman, Fluorescence and NMR. An introduction will be given for each technique followed by more practical examples of applications.

The idea behind the workshop is also to bring together industry and university for a better understanding of the requirements in process control, monitoring and optimization.

**Audience:** The workshop is intended for people working in process environments where chromatographic and/or spectroscopy techniques are used. Also people working with old-fashioned and time-consuming measurements that could be replaced by faster and more reliable methods could benefit from this workshop. As several people are involved in this workshop no teaching material will be handed out but we will make this available after the workshop.

Lectures and slides will be in English.

**Teachers:** Q&T and ODIN partners

Lunch and coffee will be included. This ODIN workshop is limited to six persons per membership.

Enroll to Birger Pedersen ([Bpe@life.ku.dk](mailto:Bpe@life.ku.dk)) April 7th 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 three days in advance or a fee of 500 DKK will be charged.