CESPE ACADEMY

DESIGN OF EXPERIMENTS

Course Programme

Day 1 – Introduction to Design of Experiments

Linear regression analysis
- o Quantitative & categorical factors
- o Main effects, interaction effects, quadratic effects
- o Selecting, visualizing, and exploiting models

Optimal design of experiments
- o Precision of estimation and prediction
- o D- and A-optimal design
- o I-optimal design
- o Orthogonal design
- o Randomization

D- and A-optimal screening experiment

Day 2 – Screening, optimization and mixtures

I-optimal response surface experiments
- o Combining quantitative and categorical factors
- o Dealing with constraints on the levels of the factors

Blocking
- o Importance of blocking and modelling its data
- o Blocked screening experiment
- o Blocked response surface experiment

Mixture experiments
- o Dedicated regression models
- o Visualizing data and models
- o I-optimal design of experiments for mixtures

Day 3 – Budget-constrained DoE

Split-plot types of experiments
- o Hard-to-change factors
- o Multi-stage experimentation
- o Restricted randomization
- o Modeling data in the event of restricted randomization
- o Split-(split-)plot experiments
- o Strip-plot experiments

Combining screening and response surface experiments in one
- o Definitive screening designs
- o OMARS designs

Information

Time and Date: 10:00 - 17:00
29th and 30th April, & 6th May 2026

Place: **Faculty of Pharmaceutical Sciences**
Ottergemsesteenweg 460, Ghent, Belgium

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Course Description

Design of experiments, or **DoE**, is a key tool for product and process improvement and innovation in pharmaceutical domain. This course motivates the standard and routine use of a fully flexible approach to the design of experiments, named **optimal design of experiments**, by showing its industrial application in a variety of case studies covering a wide range of practical situations. The increasing computing power has made optimal experimental design a key tool for scientists and researchers in the 21st century.

The course will cover completely randomized experiments, blocked experiments and split-plot types of experiments, applied to screening experiments and response surfaces experiments. This training will conclude with a discussion of definitive screening designs and OMARS designs, which allow an efficient combination of screening and response surface experimentation.

Throughout the course, the introduction of new theoretical concepts, demonstrations with the **JMP software**, and exercises are intertwined.

Course is instructed by **Prof. Peter Goos**

Target Audience

Professionals, researchers, and PhD students in chemical, pharmaceutical, and healthcare sciences and engineering who wish to enhance their understanding and application of optimized experimental design.