



Course Programme

- **Day 1: Fundamentals of DoE**
 - Why DoE? Drawbacks of non-DoE methods
 - DoE “Active Learning” approach & goal
 - Define-Model-Design-Analyze workflow
 - Experimental Design Concepts
 - Factorial designs
 - Computer-aided Optimal Designs & JMP software
 - JMP: model fitting, evaluation and diagnostic plots
 - Regression Modelling and Analysis
 - Case Study: Response surface optimization “Central Composite Design (CCD)”
- **Day 2: Advanced methods & case studies**
 - DoE with categorical effects: robust DoE
 - Exercise:
 - Optimization of a UHPLC analysis method
 - Definitive Screening Design (DSD)
 - Efficient screening of many factors
 - Case study: Factor screening for a UHPLC method
 - “Quality by Design” case study
 - Defining the Design Space and Control Space
 - Introduction to Mixture DoE
 - Factors as formulation components
 - Mixture DoE with process effect
 - Concepts and case studies
- **Day 3: Specialized DoE Applications**
 - Exercise in Mixture DoE:
 - Formulation of an emulsion gel
 - Split Plot DoE
 - Experiment with hard-to-change factors
 - Open Questions and Discussion
 - Participant case studies
 - Wrap-up and key takeaways

Information

- Time and Date:
- 9:00 – 16:00 **15th–16th of September 2026**
 9:00 – 16:00 **6th of October 2026**
- Place: **Faculty of Pharmaceutical Sciences**
 Ottergemsesteenweg 460, Ghent, Belgium
- Contact: Mark.Gontsarik@UGent.be

Course Description

The DoE training is hands-on and designed for individuals who want to actively engage in Experimental Design and gain a better understanding of the statistical analysis of experimental data.

The course emphasizes the **Optimal Design of Experiments**, matching the experimental design to the problem while considering all experimental boundary conditions and constraints. Optimal DoE is computer-aided, meaning experiment runs and regression models are generated by computer algorithms; **the software package used is JMP**. The topics are illustrated through case studies and examples from industrial R&D, making the training particularly relevant for professionals in that field.

The course begins by covering the necessary theory, including basic training in linear multiple regression analysis for analyzing experimental data and establishing statistical process models needed for parameter screening and optimization. JMP software package will be introduced, and simple cases will be reviewed to describe the basic DOE approach. Next, more complex examples with specific experimental conditions are covered. In each of the case studies, the goal is to improve the performance of a process or product through efficient exploration and optimization. On the last day of the course, time is set aside to address any questions related to participant's own use-cases.

Instructors: **Frank Deruyck & Volker Kraft**