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**Course ID: S08M**

## **DESIGN OF EXPERIMENTS (DOE) WITH MINITAB**

### **Two-day onsite workshop**

#### **1. Design of Experiments (DOE)**

DOE is an approach to process design and analysis that identifies which input factors in a process (e.g. temp, pressure, time, altitude, colour, material type) have most influence on the process outputs, and enables the selection of optimal settings for these inputs in order to optimize process outputs. This interactive workshop introduces DOE to development chemists, engineers, managers, and technicians. The focus is on the practical application of this essential product and process development tool.

The course covers factor selection, experiment design and execution, and visual statistical analysis and on how to use Minitab effectively to design and run experiments. It is a foundation course in DOE, designed for a broad audience. Tuition in more advanced DOE techniques is also available for those who would like to become subject matter experts.

#### **2. Learning Objectives and Deliverables**

Upon completion, participants will understand:

- The need for good experiment design
- How to select relevant factors (process inputs) for DOE
- How to structure selection of tests to run, to minimise the amount of testing needed
- How to design and run an experiment
- How to graph and analyse DOE results
- How to bring about a significant sustainable process improvement, based on scientific understanding of influencing process inputs.

#### **3. How will you be supported?**

During this onsite workshop, you will be able to

- a) listen to and interact with the course tutor and other participants;
- b) work through Minitab exercises;
- c) practice on the DOE simulation tool;
- d) Ask questions and complete in-course quizzes, and
- e) download soft copy presentation files, with data sets and case studies, for your own future use.

On completion of the course, you will receive a Lean Ireland certificate of completion.

### 3. Workshop agenda

Time	Day 1	Day 2
9:00	Introductions Introduction to DOE Measurement systems analysis (MSA) and its role in DOE Pre experimental techniques Designing a simple experiment Factor selection Centrepoinets Running a simple experiment – catapult exercise	Quiz Analysing and experiment statistically 'A Mug's Guide to DOE statistical Analysis' cont'd Fractional Factorial Experiments – how to screen many factors with a few runs Aliasing in DOE
12:30	Lunch	Lunch
13:30	Catapult exercise (cont'd) Analysing and experiment graphically 'A Mug's Guide to DOE statistical Analysis'	Resolution III & IV experiments Qualitative factors and blocking Refining the model Evolutionary Operations (EVOP) Case study review Assignment (optional)
16:30	Review & close	Review & close

### 4. Who should attend?

This course is suitable for product or process development chemists, engineers, scientists and statisticians in all industries and services including pharmaceutical, medical, automotive, general engineering, semiconductor, plastics and composites. DOE is also particularly useful for the development of new analytical tests and methods. In summary, this approach is useful to anyone charged with optimizing the performance of a process that has many input variables.

Prior to participating, participants should have a basic knowledge of statistics. A foundation webinar can be arranged for those who need a grounding in statistics before the course commences.

### 5. Tailoring the course for your organisation

An advanced DOE course is also available which addresses issues such as e.g. multiple responses and curvature. The course content can be tailored to suit your organization e.g. the course can be facilitated using SAS JMP. Also, Lean Ireland tutors provide onsite consulting services in DOE design and execution. Please contact us to discuss your needs.

### 6. Where can you find out more?

Please contact Bernie Rushe at Lean Ireland,  
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