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Course ID: S08M

DESIGN OF EXPERIMENTS (DOE) WITH MINITAB

Online course: 4 modules x 4 hours each, with online simulation tool

1. What is this course about?

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. It enables the selection of optimal settings for these inputs in order to optimize process outputs. This series of four interactive 4-hour workshops introduces DOE to development chemists, engineers, managers, and technicians. The focus is on the practical application of this essential product and process development tool. Online learning is enabled by exercises completed by participants on an online simulation 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. What will you achieve?

Upon completion, you 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 online course, you will

a) be able to listen to and interact with the online course tutor and other participants;

b) be able to ask questions and complete online quizzes to self-assess your understanding of the topic;

c) be able to practice on the DOE simulation tool in your own time;

d) be able to download all online course recorded webinars for your own future use, and

e) be able to 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.

4. Webinar agenda

Webinar ID	Content
S08 E01	**Full Factorial DOE** Introductions Introduction to Minitab Measurement systems analysis (MSA) and its role in DOE Pre experimental techniques Introduction to DOE Designing a simple full factorial experiment Factor selection Centrepoints Running a simple experiment – Catapult simulation Assignment (optional)
S08 E02	**Statistical & graphical analysis** Quiz Analysing and experiment graphically Analysing and experiment statistically 'A Mug's Guide to DOE statistical Analysis'
S08 E03	**Fractional factorial DOE** Quiz '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 Qualitative factors and blocking Refining the model
S08 E04	**Response surface methodology** Multiple response experiments Identifying curvature Evolutionary operations (EVOP) Response surface methodology Case study review

Total webinar contact hours = 16 hours

The webinars will be hosted on a secure group in the Lean Ireland learning management system. In advance of course commencement, participants will be enrolled in the secure group.

5. Who is this course for?

This series of online DOE webinars is designed 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.

6. Tailoring the course for your organisation

The above workshop is a foundation course in DOE. Participants who attend the foundation course will be enabled to design and run basic DOEs and make process improvements based on the results. 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.

7. Where can you find out more?

Please contact Bernie Rushe at Lean Ireland,

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e-mail: info@leanireland.ie, web site: www.leanireland.ie