

## **Short Course: Overview of Design of Experiments**

### **Overview/Course Outcomes**

Well-designed experiments are a powerful tool for developing and validating cause and effect relationships when evaluating and improving product and process performance and for operational testing of complex systems. Designed experiments are the only efficient way to verify the impact of changes in product or process factors on actual performance.

The course outcomes are:

- Ability to plan and execute experiments
- Ability to collect data and analyze and interpret these data to provide the knowledge required for business success
- Knowledge of a wide range of modern experimental tools that enable practitioners to customize their experiment to meet practical resource constraints

The topics covered during the course are:

- Fundamentals of DOX - randomization, replication, and blocking.
- Planning for a designed experiment - type and size of design, factor selection, levels and ranges, response measurement, sample sizes.
- Graphical and statistical approaches to DOX analysis.
- Blocking to eliminate the impact of nuisance factors on experimental results.
- Factorial experiments and interactions.
- Fractional factorials - efficient and effective use of experimental resources.
- Optimal designs
- Response surface methods

This course is focused on helping you and your organization make the most effective utilization of DOX. Software usage is fully integrated into the course

### **Who Should Attend**

The course is suitable for participants from an engineering or technical background. It would be helpful if course participants have some previous experience and background with six sigma methods and a background in statistics.

### **Reference Materials**

The course is based on the textbook *Design and Analysis of Experiments*, 8<sup>th</sup> Edition, by Douglas C. Montgomery. Both JMP and Design-Expert Software will be discussed and illustrated.