QUALITY CONTROL AND IMPROVEMENT WITH MINITAB

PROF. INDRAJIT MUKHERJEE

Department of Management

IIT Bombay

PRE-REQUISITES : Basic Course on Statistics and Quality Management (Web or Video)

INTENDED AUDIENCE : Operations Management, Mechanical Engineering, Production Engineering, Metallurgical Engineering, Industrial Engineering, Chemical Engineering, Chemistry, Pharmaceutical Sciences

INDUSTRIES APPLICABLE TO : Tata Motors Limited; Mahindra & Mahindra Limited; Maruti Suzuki Limited; Tata Steel Limited; Sundaram Clayton Limited; Ceat Limited; Glenmark Pharmaceuticals Limited; GE Global Research; General Motors Limited; Ford Motors Limited, Cummins Limited

COURSE OUTLINE :

This course will emphasize on application of different theories, tools, and techniques for Quality Control and Improvement. Most of the topics will be discussed with relevant problems and solutions in MINITAB 19 software interface. The course will emphasize two broad areas (e.g., Quality of Design and Quality of Conformance). In Quality of Design, relevant topics, such as VOC, Kano model, QFD, and FMEA, will be discussed with examples. Subsequently, the Quality of Conformance topics, such as quality control (e.g., statistical process control) and various topics related to process capability analysis, are discussed. With an objective to discuss topics related to the design of experiments, few important statistical techniques, such as hypothesis testing, ANOVA, regression analysis, and MSA are covered in this course. Finally, various Design of Experiment (DOE) techniques for factor screening and quality improvement are elaborated with examples. These techniques include factorial designs, fractional factorial design, multiple response optimization, and the Taguchi method.

ABOUT INSTRUCTOR :

Prof. Mukherjee is currently working as Professor in the Shailesh J. Mehta School of Management, IIT Bombay. Before joining IIT Bombay, he was Lecturer in the School of Management Science, Bengal Engineering and Science University (BESU), West Bengal (India), and in Mechanical Engineering Group, Birla Institute of Technology and Science (BITS), Pilani, Rajasthan (India). He also worked for Tatamotors Limited, as Senior Engineer, in the Central Quality Division, Pune Plant. Dr. Mukherjee did his Ph.D. from the Department of Industrial Engineering and Management, Indian Institute of Technology Kharagpur, West Bengal (India), and Master‚Äôs Degree in Quality, Reliability and Operations Research from Indian Statistical Institute, Kolkata, West Bengal (India). His Bachelor‚Äôs degree is in Mechanical Engineering from Jalpaiguri Government Engineering College (JGEC), West Bengal (India). Dr. Mukherjee currently works on varied research problems in the domain of Operations Management (e.g. Multiple Response Process Optimization, Sourcing in Supply Chain, and Quality Management).

COURSE PLAN :

Week 1**:** Introduction to Quality, Voice of the Customer, Kano Model, Quality Function Deployment, and Data Visualization with MINITAB

Week 2**:** Pareto Chart, Cause and Effect Diagram, Failure Mode and Effect Analysis, and Statistical Process Control using MINITAB

Week 3**:** Attribute Control Charts, Process Capability Index, Process Performance, and Sigma Level using MINITAB

Week 4**:** Basic Statistics, Hypothesis Testing, and ANOVA Analysis using MINITAB

Week 5**:** One-way ANOVA , Linear Regression, and Multiple Regression using MINITAB

Week 6**:** Multiple Regression (Continued), Basics on Design of Experiment, and Two-way ANOVA using MINITAB

Week 7**:** Measurement System Analysis, and Factorial Design of Experiments using MINITAB

Week 8**:** Blocking in Factorial Design, Response Surface Methodology, Multiple response Optimization, Fractional Factorial Design, and Taguchi Method using MINITAB