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Nota di contenuto	Front Cover; Design of Experiments for Engineers and Scientists; Copyright Page; Contents; Preface; Acknowledgements; 1 Introduction to Industrial Experimentation; 1.1 Introduction; 1.2 Some Fundamental and Practical Issues in Industrial Experimentation; 1.3 Statistical Thinking and its Role Within DOE; Exercises; References; 2 Fundamentals of Design of Experiments; 2.1 Introduction; 2.2 Basic Principles of DOE; 2.2.1 Randomisation; 2.2.2 Replication; 2.2.3 Blocking; 2.3 Degrees of Freedom; 2.4 Confounding; 2.4.1 Design Resolution 2.4.2 Metrology Considerations for Industrial Designed Experiments 2.4.3 Measurement System Capability; 2.4.4 Some Tips for the Development of a Measurement System; 2.5 Selection of Quality Characteristics for Industrial Experiments; Exercises; References; 3 Understanding Key Interactions in Processes; 3.1 Introduction; 3.2 Alternative Method for Calculating the Two-Order Interaction Effect; 3.3 Synergistic Interaction Versus Antagonistic Interaction; 3.4 Scenario 1; 3.5 Scenario 2; 3.6 Scenario 3; Exercises; References; 4 A Systematic Methodology for Design of Experiments; 4.1 Introduction 4.2 Barriers in the Successful Application of DOE 4.3 A Practical Methodology for DOE; 4.3.1 Planning Phase; Problem Recognition and Formulation; Selection of Response or Quality Characteristic; Selection

of Process Variables or Design Parameters; Classification of Process Variables; Determining the Levels of Process Variables; List All the Interactions of Interest; 4.3.2 Designing Phase; 4.3.3 Conducting Phase; 4.3.4 Analysing Phase; 4.4 Analytical Tools of DOE; 4.4.1 Main Effects Plot; 4.4.2 Interactions Plots; 4.4.3 Cube Plots; 4.4.4 Pareto Plot of Factor Effects
4.4.5 NPP of Factor Effects
4.4.6 NPP of Residuals; 4.4.7 Response Surface Plots and Regression Models; 4.5 Model Building for Predicting Response Function; 4.6 Confidence Interval for the Mean Response; 4.7 Statistical, Technical and Sociological Dimensions of DOE; 4.7.1 Statistical Dimension of DOE; 4.7.2 Technical Dimension of DOE; 4.7.3 Sociological and Managerial Dimensions of DOE; Exercises; References;
5 Screening Designs; 5.1 Introduction; 5.2 Geometric and Non-geometric P-B Designs; Exercises; References; 6 Full Factorial Designs; 6.1 Introduction
6.2 Example of a 22 Full Factorial Design
6.2.1 Objective 1: Determination of Main/Interaction Effects That Influence Mean Plating Thickness; 6.2.2 Objective 2: Determination of Main/Interaction Effects That Influence Variability in Plating Thickness; 6.2.3 Objective 4: How to Achieve a Target Plating Thickness of 120 Units?; 6.3 Example of a 23 Full Factorial Design; 6.3.1 Objective 1: To Identify the Significant Main/Interaction Effects That Affect the Process Yield; 6.3.2 Objective 2: To Identify the Significant Main/Interaction Effects That Affect the Variability in Process Yield
6.3.3 Objective 3: What Is the Optimal Process Condition?

Sommario/riassunto

The tools and techniques used in Design of Experiments (DoE) have been proven successful in meeting the challenge of continuous improvement in many manufacturing organisations over the last two decades. However research has shown that application of this powerful technique in many companies is limited due to a lack of statistical knowledge required for its effective implementation. Although many books have been written on this subject, they are mainly by statisticians, for statisticians and not appropriate for engineers. Design of Experiments for Engineers and Scientists
