3. **A guide to expert systems,** Waterman, D.A., Addison – Wesley inc. 1986
4. **Building expert systems,** Hayes, Roth, Waterman, D.A. Addison – Wesley, 1983

DESIGN OF EXPERIMENTS

Subject Code	**: 10ME847**	**IA Marks**	**: 25**
Hours/Week	**: 04**	**Exam Hours**	**: 03**
Total Hours	**: 52**	**Exam Marks**	**: 100**

PART – A

UNIT - 1

Introduction: Strategy of Experimentation, Typical applications of Experimental design, Basic Principles, Guidelines for Designing Experiments.

05 Hours

UNIT - 2

Basic Statistical Concepts: Concepts of random variable, probability, density function cumulative distribution function. Sample and population, Measure of Central tendency; Mean median and mode, Measures of Variability, Concept of confidence level. Statistical Distributions: Normal, Log Normal & Weibull distributions. Hypothesis testing, Probability plots, choice of sample size. Illustration through Numerical examples.

07 Hours

UNIT - 3

Experimental Design: Classical Experiments: Factorial Experiments: Terminology: factors, levels, interactions, treatment combination, randomization, Two-level experimental designs for two factors and three factors. Three-level experimental designs for two factors and three factors, Factor effects, Factor interactions, Fractional factorial design, Saturated Designs, Central composite designs. Illustration through Numerical examples.

07 Hours

UNIT - 4

Analysis And Interpretation Methods: Measures of variability, Ranking method, Column effect method & Plotting method, Analysis of variance (ANOVA) in Factorial Experiments: YATE's algorithm for ANOVA, Regression analysis, Mathematical models from experimental data. Illustration through Numerical examples.

07 Hours

PART – B

UNIT - 5

Quality By Experimental Design: Quality, Western and Taguchi's quality philosophy, elements of cost, Noise factors causes of variation. Quadratic loss function & variations of quadratic loss function. Robust Design: Steps in Robust Design: Parameter design and Tolerance Design. Reliability Improvement through experiments, Illustration through Numerical examples.

06 Hours

UNIT - 6

Experiment Design Using Taguchi's Orthogonal Arrays: Types of Orthogonal Arrays, selection of standard orthogonal arrays, Linear graphs and Interaction assignment, Dummy level Technique, Compound factor method, Modification of linear graphs. Illustration through Numerical examples.

08 Hours

UNIT - 7

Signal To Noise Ratio: Evaluation of sensitivity to noise. Signal to Noise ratios for static problems: Smaller-the-better type, Nominal-the –better-type, Larger-the-better type. Signal to Noise ratios for Dynamic problems. Illustration through Numerical examples.

06 Hours

UNIT - 8

Parameter And Tolerance Design: Parameter and tolerance design concepts, Taguchi's inner and outer arrays, parameter design strategy, tolerance design strategy. Illustration through Numerical examples.

06 Hours

TEXT BOOKS:

1. **Design and Analysis of Experiments,** Douglas C. Montgomery, 5th Edition Wiley India Pvt. Ltd. 2007
2. **Quality Engineering using Robust Design,** Madhav S. Phadke, Prentice Hall PTR, Englewood Cliffs, New Jersy 07632, 1989.

REFERENCE BOOK:

1. **Quality by Experimental Design,** Thomas B. Barker, Marcel Dekker, Inc ASQC Quality Press.1985.
2. **Experiments Planning, analysis, and parameter Design optimization,** C.F. Jeff Wu Michael Hamada, John Wiley Editions. 2002.
3. **Reliability Improvement by Experiments,** W.L. Condra, Marcel Dekker, Inc ASQC Quality Press.1985.
4. **Taguchi Techniques for Quality Engineering,** Phillip J. Ross, 2nd Edn. McGraw Hill International Editions, 1996.

DESIGN FOR MANUFACTURING AND ASSEMBLY

Subject Code	**: 10ME848**	**IA Marks**	**: 25**
Hours/Week	**: 04**	**Exam Hours**	**: 03**
Total Hours	**: 52**	**Exam Marks**	**: 100**

PART - A

UNIT-1

Tolerances, Limits & Fits: General Tolerances, Tolerance grades, Limits fundamental deviation, Fits, Tolerance Accumulation cumulative effect of tolerances in assembly. Relationship between attainable tolerance grades and different machining processes.

06 Hours

UNIT-2

Geometric Tolerances: Geometrical characteristics and symbols. Definition and Measurement of circularity, cylindricity, flatness and runout. True position tolerance.