DESIGN AND ANALYSIS OF EXPERIMENTS

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IIT KGP

TYPE OF COURSE : Rerun | Core | PG
COURSE DURATION : 12 Weeks (18 Jan' 21 - 09 Apr' 21)
EXAM DATE : 24 Apr 2021

PRE-REQUISITES : Probability and statistics

INTENDED AUDIENCE : All Engineering
Science
Management Students

INDUSTRIES APPLICABLE TO : Manufacturing companies like GM, Tata Motors, Tata Steel
Process industries such as ONGC
General Electric
R&D organizations

COURSE OUTLINE :

The objective of this course is to impart students a holistic view of the fundamentals of experimental designs, analysis tools and techniques, interpretation and applications. Upon completion of this course, the students will know (i) the fundamentals of experiments and its uses, (ii) basic statistics including ANOVA and regression, (iii) experimental designs such as RCBD, BIBD, Latin Square, factorial and fractional factorial designs, (iv) application of statistical models in analysing experimental data, (v) RSM to optimize response of interest from an experiment, and (vi) use of software such as Minitab.

ABOUT INSTRUCTOR :

J. Maiti PhD, Professor, Department of Industrial & Systems Engineering, Indian Institute of Technology (IIT), Kharagpur has more than fifteen years of teaching, research and consulting experience on Safety Analytics, Quality Analytics and Engineering Ergonomics. He has published more than 70 papers in international and national journals of repute and more than 30 papers in conference proceedings. Till date, he has supervised 11 PhD candidates to successful completion and currently supervising 8 PhD research candidates. He has been executing a number of Industry-sponsored consulting and Government as well industry funded research projects. He has organized 17 training programmes and short-term courses for industry participants. Prof Maiti has been pursuing research on safety analytics, quality analytics, and engineering ergonomics including the applications of multivariate statistical modeling since 1995.

COURSE PLAN :

Week 1**:** Introduction to design and analysis of experiments with basic concepts and applications

Week 2**:** Basic statistics

Week 3**:** Analysis of Variance (ANOVA)

Week 4**:** Regression

Week 5**:** Experimental designs: Randomized complete block design (RCBD)

Week 6**:** Experimental designs: Variants of RCBD such as Latin Square, central composite design, etc.

Week 7**:** Experimental designs: Full factorial experiments

Week 8**:** Experimental designs: 2k factorial experiments

Week 9**:** Experimental designs: Fractional factorial experiments

Week 10**:** Experimental designs: 2k-p factorial experiments

Week 11**:** Response surface methodology (RSM)

Week 12**:** Introduction to software MINITAB