Course Catalog Number: Tme-3
Course Track: Metrology Engineers
Course Topic: Sampling
Course Career Level: Intermediate

Saturday, August 24 | 8:00 AM – 5:00 PM | 1-Day (8 Hours)

Course Title: Sample Size Calculations

Instructor: Paul Mathews, Mathews Malnar and Bailey Inc.

Abstract: Most situations that require the collection and analysis of sample data present the problem of determining an appropriate sample size. Small samples are more likely to lead to incorrect conclusions but large samples consume more resources. Formal methods of sample size determination are intended to minimize the combined costs associated with incorrect conclusions and resource consumption.

Paul Mathews will present methods for calculating sample size for confidence intervals and sample size and power for hypothesis tests for: means, standard deviations, proportions, counts, regression, correlation and agreement, ANOVA for fixed and random effects, reliability, process capability, and gage error studies. Practical methods using large sample approximations, variable transformations, and the delta method will be emphasized but exact methods will be noted where the approximate methods fail. Paul will demonstrate software solutions using MINITAB and Russ Lenth's free Piface program (www.stat.uiowa.edu/~rlenth/Power/).

This workshop is intended for engineers, scientists, statisticians, and quality professionals who are responsible for recommending sample sizes in their organizations. Attendees should have a general understanding of the calculation and interpretation of confidence intervals and hypothesis tests. Knowledge of advanced statistical methods is not required.

Learning Objectives:

1. Understand the necessity for calculating an appropriate sample size before collecting any data.
2. Lead a client through a discussion to identify the necessary inputs to a sample size calculation prior to collecting data intended to be analyzed using a confidence interval or hypothesis test.
3. Calculate approximate and, where appropriate, exact sample sizes for confidence intervals and hypothesis tests for means, standard deviations, proportions, counts, linear regression, correlation, designed experiments, fixed and random effects in ANOVA, reliability studies, process capability parameters, and gage error studies.

Instructor Curriculum Vitae (CV):
Paul Mathews is president of Mathews Malnar and Bailey, Inc., a provider of quality engineering and applied statistical consulting and training services for R&D, product, process, and manufacturing engineering organizations. Paul has over 30 years of experience as an engineer, scientist, professor, and consultant. He holds B.S. and M.S. degrees in physics from Miami University and Case Western Reserve University, respectively. Paul holds ten patents and is the author of Design of Experiments with MINITAB (2004, ASQ Quality Press) and Sample Size Calculations: Practical Methods for Engineers and Scientists (2010, Mathews Malnar and Bailey, Inc). Paul is a member of the American Statistical Association and a senior member of the American Society for Quality.