



Applied Statistics

A primer

APPLIED STATISTICS, a (solid) primer

Statistics will never be easy. And to acquire an in-depth understanding requires serious efforts and a considerable amount of time; time which may not be available to you. As an alternative for the three-day course Statistics in Practice, this compact version covers the essential concepts of statistics, from descriptive statistics over probability, hypothesis testing, power and sample size calculations to ANOVA and regression. Although primarily intended as a “foundation” on which further courses are built, this course will result in many eye-openers and at the same time enhance the quality of everyday’s decision making.

COURSE SET-UP

The set-up is similar to the first two days of the Statistics in Practice course but some more “advanced” extensions are skipped and only continuous variables will be treated. Theory will alternate with hands-on computer exercises.

COURSE OBJECTIVE

As a result of this course, participants will develop a good feel for statistics and will be able to choose an appropriate technique and interpret the results correctly for the most common types of problems.

INTENDED AUDIENCE AND PRIOR KNOWLEDGE

This course is intended for anyone who wants to acquire a solid background in statistical thinking before taking on the more advanced courses like DOE or multivariate analysis. Although everything discussed is directly applicable in practice, we recommend the three-day Statistics in Practice course if you aim at more than getting a primer.

No prior knowledge is required.

PRACTICAL

Each course day will be held from 8.30 am to about 5 pm. The course dates and fees are listed on the attached application form. The course fee includes handouts and lunches.

To apply, send us back the application form or apply on-line, at least 20 days before the start of the course .



COURSE CONTENTS

Module 1

- Descriptive statistics
 - Graphical techniques: scatter plot, histogram, dotplot, boxplot, normal probability plot
 - Descriptive statistics: means, median, variance, IQR, ...
- Good data collection practice
 - Representative sampling
 - Paired comparisons

Module 2

- Dealing with random variables (probability distributions)
 - Properties of distributions of random variables
 - The normal distribution and its derivatives (the z , χ^2 , t and F -distribution).

Module 3

- Confidence intervals for means, differences in means and variances
- Hypothesis testing
 - Hypothesis testing with confidence intervals
 - Classical hypothesis testing
 - Statistical significant versus practical relevant
 - Type I and Type II errors
 - Power and sample size calculations

Module 4

- One-way ANOVA
- Describing the similarity between variables: correlation and Simple Linear Regression

Some cases & applications: detecting and proving a change in a process / quantifying and judging the difference between two products or systems / calculating the number of data needed to detect a certain improvement / investigating the effect of different types of a constituent on the product properties / investigating the effect of a process parameter on a characteristic