



Introductory Statistics for Analytical Chemists

This is a one day introductory course to the fundamental of statistics, relevant to all professionals in the analytical sciences, life sciences and related fields.

Course Contents

Introduction

- Analytical problems
- Errors in quantitative analysis
- Random and systematic errors
- Accuracy, repeatability, reproducibility
- Standard reference materials

Statistical Measures

- Mean and standard deviation
- Variance and coefficient of variation

Normal (Gaussian) Distribution

- Sampling distributions
- Confidence limits
- Significant figures
- Propagation of errors

Significance Tests

- Null hypothesis, type I and type II errors
- Comparison of x and μ / Comparison of x_1 and x_2
- t-tests / F-tests
- One-sided and two-sided tests
- Outliers
- Analysis of variance (ANOVA)
- Fixed effects and random effects
- Comparison of several means

Regression and Correlation

- Calibration graphs / correlation coefficient
- Regression of y on x / errors in the regression line
- Calculation of a concentration
- Limit of detection
- Standard additions
- Outliers in regression
- Weighted regression lines



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