MT-235 (Statistics for Chemists)

INTRODUCTION TO STATISTICS: Introduction, Types of data and presentation techniques, measure of central tendency and dispersion.

PROBABILITY AND PROBABILITY DISTRIBUTIONS
Basic concepts of probability, Random Variables, Probability Distributions, Binomial, Poisson, Hypergeometric, Uniform, Normal, Exponential distribution. Central Limit Theorem.

STATISTICAL INFERENCE AND HYPOTHESIS TESTING: Estimation, Testing of Hypothesis, z-test and t-test, p-values and significance levels, One-tail and two-tail tests, Chi-Square test for goodness of fit and test of independence.

CORRELATION AND REGRESSION ANALYSIS
Scatter diagrams, Correlation coefficient, Simple and Multiple linear regression. Fitting of linear and non-linear models using least squares method.

ANALYSIS OF VARIANCE (ANOVA) AND QUALITY CONTROL
Basic concept of ANOVA for comparing more than two means—application in experimental design. One-way ANOVA and F-tests. Introduction to Statistical Process Control (SPC): Control charts, Process capability analysis, Use in production and quality assurance of chemical compounds.

Text Book

1. J.C. Miller and J.N. Miller, Statistics for Analytical Chemistry (4th Edition), Pearson Education Limited (2010).

Reference Books

2. D.S. Moore and G.P. McCabe, Introduction to the Practice of Statistics (8th Edition), W.H. Freeman and Company (2014).
3. Daniel C. Harris, Quantitative Chemical Analysis (9th Edition), W.H. Freeman and Company (2016).
4. Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers (6th Edition), Wiley (2014).
5. Peter C. Meier and Richard L. Zünd, Statistical Methods in Analytical Chemistry (2nd Edition), Wiley-Interscience (2000).