



## COURSE DATASHEET

<b>Semester:</b>	2015/16/2
<b>Course:</b>	Chemometrics and Data Acquisition
<b>Code:</b>	VEMKKAM443K
<b>Responsible department:</b>	Department of Analytical Chemistry
<b>Department code:</b>	MKKA
<b>Responsible instructor:</b>	dr. Tamás Pap

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### Course objectives:

Understanding of the fundamentals of chemometrics.

### Course content:

1. Statistical evaluation of measured data. Theoretical basis. Distribution functions. Statistical moments. 2. Random and systematic errors. Functions of error propagation 3. Test of outliers, t-test, F-test. 4.. Analysis of variance. Techniques for one-way analysis of variance. Two-way analysis of variance. 5. Correlation analysis. Regression analysis. Linear and non-linear regression. 6. Principles of calibration. Modes of calibration. Test for linearity. 7. Experimental design. 2<sup>n</sup> type factorial design. Simplex method. Latin square design 8. Classification of samples by statistical method. Pattern recognition. Clusteranalysis. Nearest neighbour and k-th nearest neighbour method. 9. Definition of analog and digital signals. Classification of analog signals. The quality of the signal. The signal-to noise ratio. 10. Deterministic and periodic signals. Stationer and random signals. The type of noise and the source of noise. improvement of the quality of analog signal: filtering, modulation. 11. The digitization of the analog signals. Theory of Shannon. Transformation of analog-to-digital (A/D). 12. Examination of the signal-time functions in frequency domain. The Fourier Transform of the continous and discrete signals. 13. Improvement of the digital signal. Smoothing. Method of Savitzky-Golay. 14. Addition of spectra. Smoothing using Fourier-transformation.

### Requirements, evaluation and grading:

The topics of the lectures.

### Required and recommended readings:

Dr. Inczédy János: Folyamatos és automatikus analízis. Műszaki Könyvkiadó, Budapest, 1984.