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## Microarray Center of CRP-Santé invites for a Training Session : Applied Statistics

Location: Maternity - Centre Hospitalier de Luxembourg, 120 route d'Arlon, Luxembourg

The course gives an overview of the basics of applied statistics for researchers, engineers and students. It is specifically dedicated to those, who having no special knowledge in statistics, use or would like to use statistical methods in their practice. The course is built in the way that even a person with no background in statistics is able to follow it. Special attention is given to understanding of the basic rules and objects of a statistical investigation and their application. For this purpose examples will be given throughout the lectures. The course is divided into 6 three-hour sections, each followed by a small test for a self control. Practical parts (conducted in Excel) are integrated into the lectures, allowing immediate application of the theory.

### Section I. TUESDAY November 3, 2009 - 14.00 until 17.00

#### Lecture 1. Data presentation and numerical measures

- Data and statistics
- Descriptive statistics: tabular and graphical presentation
- Descriptive statistics: numerical measures (mean, median, standard deviation, variance, correlation)
- z-score. Chebyshev's theorem. Detection of outliers

#### Lecture 2. Introduction to probability

- Introduction to probability
- Calculation of probability
- Bayes' theorem

### Section II. WEDNESDAY November 4, 2009 - 14.00 until 17.00

#### Lecture 3. Probability distributions (part 1)

- Discrete probability distributions (uniform, binomial, Poisson, hypergeometric)
- Continuous probability distributions (uniform, Gaussian, exponential)

#### Lecture 4. Probability distributions (part 2)

- Continuous probability distributions (uniform, Gaussian, exponential)
- Case problem. Usage of the information about distribution

### Section III. THURSDAY November 5, 2009 - 14.00 until 17.00

#### Lecture 5. Sampling statistics

- Sampling and sampling distribution.
- Central limit theorem
- Means of sum of two normal random variables.
- Products and ratios of random variables.

#### Lecture 6. Statistical inference about mean (part 1)

- Interval estimation for the means
- Hypothesis tests and decision making
- Statistical inference about means and proportions of two populations
- Case problem. Formulation and test of hypotheses

### Section IV. TUESDAY November 10, 2009 - 14.00 until 17.00

#### Lecture 7. Statistical inference about mean (part 2)

- Nonparametric methods for the comparison of means
- Number of replicates
- Hypothesis test in the case of multiple experiments

#### Lecture 8. Statistical inferences about variance

- Interval estimation for the variance
- Hypothesis test for the variances of two population
- Tests of goodness of fit and independence

### Section V. WEDNESDAY November 11, 2009 - 9.00 until 12.00

#### Lecture 9. Analysis of variance (ANOVA)

- One-way ANOVA.
- Two-way ANOVA

#### Lecture 10. Topics in applied data analysis

- Multi-factor ANOVA
- Experimental design
- Principle component analysis (PCA)

### Section VI. THURSDAY November 12, 2009 - 9.00 until 12.00

#### Lecture 11. Regression

- Linear regression. Estimation of the parameters
- Nonlinear regression
- Quality control
- Forecasting

#### Lecture 12. Final remarks

- Verification of the tests
- Questions

## Free Registration

To register, please send a message with your name and affiliation to Aurélie Derischebourg: aurelia.derischebourg@crp-sante.lu  
The number of participants is limited, the advantage will be given to those who register early and for all sessions.

#### For further information :

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#### Contact registration :

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