

Advanced Statistics

Course Workload		Assessment form (examination/ graded test/ ungraded test)
ECTS	Hours	
3	108	Exam

The course includes such methods of statistical analysis as descriptive statistics, building estimates and confidence intervals, testing hypotheses.

Course structure:

1. Sample, estimates. Descriptive statistics.

- 1.1. Random variables
- 1.2. Distribution of $F(x)$
- 1.3. Independent random variables
- 1.4. Samples
- 1.5. Estimates. Maximum likelihood estimator
- 1.6. MLE, method of moments
- 1.7. Confidence intervals

2. One-sample hypothesis testing

- 2.1. Hypothesis testing via statistics of criterion
- 2.2. Type II error analysis
- 2.3. P-value
- 2.4. Pearson χ^2 test
- 2.5. Kolmogorov-Smirnof
- 2.6. Pearson and Spearman correlation coefficients
- 2.7. χ^2 independence test

3. Two-sample hypothesis testing. Linear regression

- 3.1. t-test (two independent samples)
- 3.2. Equality of variances
- 3.3. Non-parametric t-criterion
- 3.4. t-test for dependent samples
- 3.5. Linear regression model
- 3.6. Confidence intervals

4. Multiple hypothesis testing

- 4.1. Conditional Expectation
- 4.2. Conditional Variance
- 4.3. Law of total variance
- 4.4. ANOVA