Department of Mathematics **Faculty of Science**

MATH 782 (206782) THEORY OF STATISTICS II **3(3-0-6)**

Prerequisite MATH 781

Course Descriptions :

General theory of testing and estimation. Comparison of experiments. Sequential and non-parametric methods.

Course Contents	**No. of Lecture Hours**
1. General theory of testing	10
- The null and the alternative hypothesis	
- Neymann-Pearson lemma	
- Two types of errors and the power function of a test	
- Testing with a two sided alternatives	
- The Pearson's x^2 test and limitation	
- Likelihood ratio test	
- Contingency tables and homogeneity test	
2. Theory of estimation	10
- Method of moments	
- Point estimation of a parameter	
- Estimation by confidence intervals	
- Consistent and unbiased estimation	
- Best unbiased estimation	
- Maximum likelihood estimation	
- Determination of the sample size	
3. Comparison of experiments, sequential and non - parametric methods	25
- Experimental design models and statistical design in experiments	
- Experimental methods for correlation and regression	
- Nonlinear least squares	
- Robust estimation	
- Sequential analysis (method)	
- Sequential probability ratio test	

- Multiple decision methods
- Multiple classification techniques
- Wilcoxon's rank-sum test
- Paired comparison (sign test and Wilcoxon signed-rank test)
- Confidence intervals (based on paired differences)
- Measures of correlation (based on ranks)
- Kruskal-Wallis test for composing k treatments
- Kolmogorov-Smirnov statistics