(Textile Engineering Department)

Graduate

Course Title: **Experimental Design & Statistical Research Methods**

Lecturer: Dr. Nazanain Ezazshahabi

Course Topics:

- Empirical sciences - Error sources - Precision and accuracy concepts - Experimental approach to error-engineering view to statistics
- Representative of the population - Statistical population - Average - Weighted average -Mode and median
- Standard deviation - Distribution - Frequency distribution curve - Cumulative distribution curve - Methods for achieving probability distribution of population - Introduction of Gaussian distribution - Gaussian logarithm distribution - Null hypothesis
- Sample size - Sample population - Population mean confidence - Random variable Average sampling - Average sampling distribution -Central limit theorem
- Effect of error propagation on accuracy of estimation of mean-Mathematical relations of random error propagation
- Production and extraction of knowledge with significance tests - Detection of outliers (doubtful responses), Dixons test- The Chi-squared test
- Single-Factor Experiments with No Restrictions on Randomization (Analysis of variance rationale- tests on means-confidence limits on means-)
- General regression significance test
- After ANOVA tests(Contrast-Range test- Scheffe test- Tukey)
- Single-Factor Experiments-Randomized Block Design
- randomized complete block design
- Missing values, randomized incomplete block design
- Single Factor Experiments (Latin squares- Graeco latin squares-Youden)
- Factorial experiments design
- Qualitative and Quantitative Factors (linear regression, curvilinear regression- two factors, one qualitative, one quantitative- two factors, both quantitative)
- Taguchi Approach- Methods of reducing the number of experiments

Reading Resources:

- Fundamental Concepts in the Design of Experiments
- Practical Statistics for the Textile Industry