**CIVL 160: Statistical Methods for the Built Environment (3 credits)**

This course consists of the application of statistical methods to civil and environmental engineering problems in construction, hydrology, water quality, air pollution, and other related areas. (Prerequisite: MATH 152)

**Course Learning Outcomes:**

By the end of the course, students will be able to:

A1: Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

A2: Accept and integrate new ideas and information on their merits, even if contrary to opinion or previous experiences.

B1: Develop and conduct appropriate experimentation, analysis, and data interpretation, and use engineering judgment to draw conclusions.

B2: Calculate probabilities, use hypothesis tests to compare products or processes, and predict responses using regression analysis.

B3: Analyze the correlation between variables and apply statistics to solve real engineering problems.

C1: Function effectively as part of a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

**Course Learning Materials:**

* Montgomery, D. C. and Runger, G. C., Applied Statistics and Probability for Engineers, John Wiley and Sons.
* Benjamin J., Probability, Statistics, and Decision for Civil Engineers, Dover Publications Inc

**Course Content:**

1. The Role of Statistics in Engineering
2. Probability
3. Discrete Random Variables and Probability Distribution
4. Continuous Random Variables and Probability Distributions
5. Joint Probability Distributions
6. Descriptive Statistics
7. Point Estimation of Parameters and Sampling Distributions
8. Statistical Intervals for a Single Sample
9. Tests of Hypotheses for a Single Sample
10. Statistical Inference for Two Samples
11. Simple Linear Regression and Correlation
12. Multiple Linear Regression
13. Design and Analysis of Single-Factor Experiments: The Analysis of Variance