ISE 2211 – Statistics for Engineers

Course Description
Application of statistical techniques to engineering testing, development, and manufacturing. Basic principles of data collection and descriptive statistics; axioms of probability; discrete/continuous random variables and probability distributions; sampling theory; statistical inference; correlation/regression; analysis of variance.

Offered both face-to-face and online
Undergraduate level – 3 credit hours

Course Learning Objectives
Students enrolled in this course will learn to:
- to interpret and analyze relevant data in designed experiments using statistical inference methods, including hypothesis testing, regression analysis, and analysis of variance.

Course Learning Outcomes
Upon successful completion of this course, students can:
- interpret and analyze relevant data in designed experiments using statistical inference methods, including hypothesis testing, regression analysis, and analysis of variance.

Tentative Weekly Schedule

Both face-to-face and online versions of this course will follow same tentative weekly schedule

Week 1	Introduction to statistics, numerical data, graphical displays of data Sample spaces, set operations, Venn diagrams Counting techniques, probability
Week 2	Axioms of probability
	EXAM I
Week 3	Intro. to random variables, discrete random variables, probability distributions, prob. Mass function
	Cumulative distribution function, mean and variance
	Discrete uniform distribution, binomial, Poisson, hypergeometric
Week 4	Continuous random variables, prob. density functions, cumulative probability, mean and variance
	Normal and exponential distributions
	EXAM II
Week 5	Point estimation, sampling distributions, Central Limit Theorem Confidence interval on mean, variance known C.I. on mean, variance unknown

Week 6	C.I. on variance C.I. on pop. proportion; prediction interval
	EXAM III
Week 7	Intro. to hypothesis testing; tests on mean, variance known; C.I. approach Fixed-significance and p-value approaches; type-I and -II errors Tests on mean, variance unknown
Week 8	Tests on variance Tests on population proportion
	EXAM IV
Week 9	Intro to two-sample hypothesis testing; tests on difference in means, variance known Tests on difference in means, variance unknown Paired t-test
Week 10	Tests on equality of variances Tests on population proportion
	EXAM V
Week 11	Simple Linear Regression Least Squares Estimators Estimator of variance, hypothesis tests on slope and intercept
Week 12	C.I. on slope, intercept, mean response; prediction of new observations Correlation Hypothesis tests and C.I. on correlation
Week 13	EXAM VI
	Introduction to ANOVA, data organization Computations, the ANOVA identity, ANOVA tables
Week 14	F-test, C.I. on treatment mean Fisher's Least Significant Difference
Week 15	EXAM VII