SYLLABUS
PART I
EDISON COMMUNITY COLLEGE
MTH 125S GENERAL STATISTICS
3 CREDIT HOURS

COURSE DESCRIPTION

Introductory general statistics course. Topics include data organization and display; measure of dispersion and central tendencies; probability models, random variables and finite probability distributions; normal and binomial distributions; construction of scatter plots of bivariate data and interpretation of linear regression; normal distribution approximation to the binomial distribution; central limit theorem and confidence limits; introduction to experimental design and sampling; and statistical control charts for statistical process control (SPC). Prerequisite: Satisfactory math assessment score and three years of college preparatory mathematics, or grade of "C" or better in MTH 099D. Lab fee.

COURSE GOALS

The student will:

1. Select and produce appropriate graphical, tabular, and numerical summaries of the distributions of variables in a data set.
2. Summarize graphical, tabular, and numerical distributions of data into verbal descriptions.
3. Summarize relationships in bivariate data using graphical, tabular, and numerical methods.
4. Develop scatter plots, two-way tables, correlation coefficients and least squares regression lines to display bivariate data.
5. Investigate and describe the relationships or associations between two variables using caution in interpreting correlation and association.
6. Interpret z-scores and compute probabilities using the normal distribution.
7. Compare the principles of observational and experimental studies including sampling methods, randomization, replication and control.
8. Analyze types of data collection and their affect on the types of conclusions that can be drawn.
9. Construct a model for a random phenomenon using outcomes, events, and the assignment of probabilities.
10. Use the addition rule for disjoint events and the multiplication rule for independent events to compute probabilities.
11. Compute conditional probabilities in the context of two-way tables.
12. Demonstrate the concept of the distribution of the sample mean and sample proportion under repeated sampling (Central Limit Theorem).
13. Develop sampling distributions to observe, empirically, the Central Limit Theorem.
14. Estimate a population mean or proportion using a point estimate and confidence intervals, and interpret the confidence level and margin of error.
15. Interpret the confidence level and margin of error in terms of a confidence interval.
16. Determine the appropriate sample size for a specific margin of error and confidence level.
17. Formulate null and alternative hypothesis given a research question involving a single population.
18. Describe the logic and framework of the inference of hypothesis testing.
19. Make a decision using a p-value and draw an appropriate conclusion about statistical significance.
20. Interpret statistical and practical significance through the use of a hypothesis test for a mean or proportion.

CORE VALUES

The Core Values are a set of principles which guide in creating educational programs and environments at Edison. They include communication, ethics, critical thinking, human diversity, inquiry/respect for learning, and interpersonal skills/teamwork. The goals, objectives, and activities in this course will introduce/reinforce those Core Values whenever appropriate.

TOPIC OUTLINE

1. Organization of raw data and graphical presentations of result.
2. Measures of central tendency and dispersion.
3. Analysis of methods of data collection such as experiments, observations, and surveys.
4. Necessity of random samples and techniques of sampling that assure randomness.
5. Introduction of time series and Statistical Process Control (SPC).
6. Scatter plots and lines of regression.
7. Correlative and causative behavior.
8. Cross tabulation tables and analysis of goodness of fit.
9. Probability concepts including relative frequency definition, classical definition, and rules.
10. Introduction of random variables and expected values.
11. Normal, Binomial and Chi Square distributions.
12. Sampling theory and the Central Limit Theorem.
13. Hypothesis testing for estimation of population parameters and goodness of fit situations.