OBU013 – INTRODUCTION TO BUSINESS STATISTICS
Credit Hours: 3-4 Semester Hours

Related TAG: Business

General Course Description:
This is a course of study that stresses conceptual understanding and critical thinking, as well as introduces statistical methods in a business context.

The American Statistical Association has developed a set of six recommendations for the teaching of introductory statistics – these recommendations are known as the "Guidelines for Assessment and Instruction in Statistics Education (GAISE)," which are strongly recommended in teaching or developing the introductory statistics course.

The 2016 recommendations are as follows:
1. Teach statistical thinking.
    - Teach statistics as an investigative process of problem-solving and decision-making.
    - Give students experience with multivariable thinking.
2. Focus on conceptual understanding.
3. Integrate real data with a context and purpose.
4. Foster active learning.
5. Use technology to explore concepts and analyze data.
6. Use assessments to improve and evaluate student learning.

Student Learning Outcomes in bold font and marked with an asterisk (*) are essential and must be met. All other outcomes that are stated are to be viewed as non-essential. Non-essential outcomes should be included only if there is adequate course time to do so beyond giving primary course attention to the essential learning outcomes.

1 . Give an overview of various types of sampling and the importance of randomization.
    1.01 Understand selecting a simple random sample.*
    1.02 Distinguish between observational and experimental studies.*
    1.03 Demonstrate an understanding of the basic principles of sampling methods.*

2 . Understand how to organize and summarize data by using descriptive statistics and appropriate statistical graphics.
    2.01 Use graphical methods to display a distribution of a variable and show relationships between two variables.*
    2.02 Compute and interpret measures of central tendency and spread (variation), e.g., mean, median, mode, range, variance, standard deviation, percentiles and quartiles.*
    2.03 Describe the shape of a distribution. Understand and apply the Empirical Rule for symmetric data and applications.*

3. Understand the concept of probability and its applications in a business context.

3.01 Understand the concept of probability and the properties that probabilities must satisfy. Perform computations using the rules of probability; addition and multiplication rules.*

3.02 Use conditional probability to understand the association between two categorical variables in two-way cross-tabulation tables.*

3.03 Understand the concept of statistical independence and use it to compute probabilities.*

4. Understand discrete and continuous random variables and demonstrate the ability to use their distributions to compute probabilities.

   4.01 Understand discrete random variables and use their distributions to compute probabilities.*

   4.02 Understand, compute, and interpret the expected value, variance, and standard deviation of a discrete random variable.*

   4.03 Understand the binomial distribution and apply it to business applications.*

   4.04 Understand the concept of a continuous random variable and density curve.*

   4.05 Find probabilities and percentiles for normal densities.*

   4.06 Understand the normal probability distribution and apply it to business applications.*

5. Understand the concept of sampling distributions.

   5.01 Discuss sampling distributions using simulation, interactive applets, or other hands-on activity. In particular, discuss sampling distributions for sample means and proportions.*

   5.02 Compute and interpret the mean and standard error of the sample mean and sample proportion.*

   5.03 Use the Central Limit Theorem to understand the shape of a distribution and use it to compute probabilities.*

6. Understand how to estimate population parameters using point and interval estimates.

   6.01 Define, compute, and interpret point estimates of a population mean and proportion.*

   6.02 Define the properties of the point estimates of the mean and proportion. (e.g. unbiasedness, consistency).

   6.03 Demonstrate knowledge of the concept of a confidence interval for a population mean and proportion including its margin of error and level of confidence.*

   6.04 Compute and interpret a confidence interval for a population mean and proportion.*

   6.05 Demonstrate the ability to determine the sample size needed to give a specific margin of error and confidence level when estimating a population mean or proportion.

7. Use hypothesis testing as a tool for statistical decision making in a business context.

   7.01 Understand the concept and steps of performing a hypothesis test.*

   7.02 Use one or more pieces of statistical evidence such as p-value, critical value, and/or confidence interval to draw conclusions regarding hypotheses.*

8. Use hypothesis testing to compare two population parameters within the business context.

   8.01 Understand testing procedures for comparing two population means or two proportions.

   8.02 Use independent samples and paired sample test procedures to compare two population means.

   8.03 Use independent samples to compare two population proportions.

9. Use simple linear regression for business analysis and decision-making.

   9.01 Use a scatter plot to assess the appropriateness of performing a simple linear regression.*

9.02 Find and interpret the least squares estimates of the intercept and slope. Use the least squares line to make predictions.*

9.03 Find and interpret the correlation coefficient. Understand the distinction between correlation and causation.*

9.04 Understand the distributional assumptions of a linear regression model.

9.05 Use residual plots to validate the model assumptions.

9.06 Use inferential techniques to test the significance of the slope.

9.07 Compute and interpret the coefficient of determination.

9.08 Construct and interpret confidence intervals for the mean response and prediction intervals for future responses.