

CORE COURSE PERFORMANCE OBJECTIVES

The student will be able to:

1. Organize, graph and interpret statistical data. (CCC 1, 6)
2. Compute and analyze measures of central tendency and dispersion. (CCC 6, 7)
3. Compute probabilities. (CCC 7)
4. Solve problems involving probability distributions. (CCC 2, 7)
5. Demonstrate knowledge of sampling techniques and apply sampling distribution principles. (CCC 1, 2, 3, 6)
6. Calculate point and interval estimates of the mean and proportion. (CCC 6, 7)
7. Perform hypothesis testing of the mean and proportion. (CCC 6, 7)
8. Use computer software to generate statistical measures and solve applied problems. (CCC 6)

MEASURABLE PERFORMANCE OBJECTIVES

1. **Organize, graph and interpret statistical data. (CCC 1, 6)**
 - 1.1 Define or describe each of the following:
 - a. Business Statistics
 - b. Descriptive versus Inferential Statistics and relevant terminology
 - c. Types of Variables – Qualitative and Quantitative
 - d. Scales of Measurement – Nominal, Ordinal, Interval, Ratio
 - e. Terminology Describing a Frequency Distribution – class, frequency, class limits, class interval, class mark
 - 1.2 Arrange a given data set in
 - a. a data array
 - b. a frequency distribution
 - c. a relative frequency distribution
 - d. a cumulative frequency distribution
 - e. a cumulative relative frequency distribution
 - f. a stem-and-leaf display
 - 1.3 Graph a set of raw data or a distribution using:
 - a. a histogram
 - b. a frequency polygon
 - c. a bar chart
 - d. a multiple-bar chart
 - e. a component-bar chart
 - f. a line graph
 - g. a pie chart
 - h. a pictogram

- 1.4 Define or describe each of the following terms:
 - a. index number
 - b. price index
 - c. quantity index
 - d. value index
- 1.5 Calculate and interpret a simple average index.
- 1.6 Calculate and interpret a simple aggregate index.
- 1.7 Calculate and interpret a weighted aggregates price index using:
 - a. Paasche Index
 - b. Laspeyres Index
 - c. Fisher's Ideal Index
- 1.8 Describe the advantages and disadvantages of the above indexes.
- 1.9 Describe how the Consumer Price Index (CPI) is obtained and three ways it is used in business.

2. Compute and analyze measures of central tendency and dispersion. (CCC 6, 7)

- 2.1 Define and describe:
 - a. measures of central tendency – arithmetic mean, weighted mean, median, mode, geometric mean
 - b. measures of dispersion – range, mean absolute deviation, variance, standard deviation
 - c. skewness – positive, negative, symmetric
 - d. quantiles – percentiles, deciles, quartiles
 - e. Chebyshev's Theorem
 - f. standardized data
 - g. coefficient of variation
 - h. box-and-whisker plot
- 2.2 Calculate the arithmetic and weighted means of grouped or ungrouped data.
- 2.3 Calculate the median of a set of grouped or ungrouped data.
- 2.4 Determine the mode of a set of grouped or ungrouped data.
- 2.5 Identify the advantages and disadvantages of mean, median, and mode as measures of central tendency.
- 2.6 Use a set of ungrouped data to calculate the range, the interquartile range, and the quartile deviation.

- 2.7 For a set of grouped or ungrouped data, from either a population or a sample, calculate:
- the mean absolute deviation
 - the variance
 - the standard deviation
- 2.8 Convert data to standardized values and use this in analysis of data.
- 2.9 Use Chebyshev's Theorem to describe the location of data values in a distribution.
- 2.10 Calculate the coefficient of variation and use this in analysis of data.

3. Compute probabilities. (CCC 7)

- 3.1 Define or describe each of the following:
- basic terms of probability – experiment, sample space, event, probability
 - approaches to probability – classical, relative frequency, subjective
 - probability versus odds
 - mutually exclusive events
 - independent events
 - conditional probability
 - Venn diagrams and contingency tables
 - permutations and combinations
- 3.2 Calculate unions and intersections of events when they are mutually exclusive, independent, or neither using multiplication and addition rules.
- 3.3 Use Bayes' Theorem in the revision of probabilities.
- 3.4 Count using the principle of multiplication, permutation, and combination.

4. Solve problems involving probability distributions. (CCC 2, 7)

- 4.1 Describe or define the following terms:
- probability distribution
 - random variable
 - discrete or continuous
 - expected values
 - binomial distribution
 - hypergeometric distribution
 - Poisson distribution
 - normal distribution
- 4.2 Construct a probability distribution and/or its graph from a given set of data.
- 4.3 Calculate the expected value, variance, and standard deviation of a discrete random variable.

- 4.4 Solve probability problems using:
 - a. the binomial distribution
 - b. the hypergeometric distribution
 - c. the Poisson distribution
 - d. the normal distribution
- 4.5 Where appropriate, use the Poisson distribution or the normal distribution to approximate the binomial distribution.
- 4.6 Identify the appropriate distribution to use in determining the probability of an event.

5. Demonstrate knowledge of sampling techniques and apply sampling distribution principles. (CCC 1, 2, 3, 6)

- 5.1 Define or describe each of the following terms:
 - a. population and parameter
 - b. sample and statistic
 - c. census
 - d. sampling error (accuracy)
 - e. nonsampling error (bias)
 - f. probability sampling
 - g. nonprobability sampling
 - h. sampling distribution of a statistic
 - i. standard error
 - j. Central Limit Theorem
 - k. point estimate
 - l. interval estimate
 - m. confidence interval
 - n. confidence level
 - o. Student's t-distribution
 - p. degrees of freedom

- 5.2 Describe the following methods of probability sampling.
 - a. simple random sampling
 - b. systematic sampling
 - c. cluster sampling
 - d. stratified sampling

6. Calculate point and interval estimates of the mean and proportion. (CCC 6, 7)

- 6.1 Use the sampling distribution of the mean to determine the probability that the mean of a sample is within specified limits.
- 6.2 Use the finite population correction factor multiplier where appropriate in calculation of standard error.

- 6.3 Calculate a point estimate for a population mean or population proportion from given sample data.
- 6.4 Use the standard normal distribution and given sample data to obtain an interval estimate of the population mean or population proportion.
- 6.5 Use the t-distribution where required to obtain an interval estimate of the mean of a population from sample data.
- 6.6 Calculate the sample size necessary to estimate a population mean or population proportion with a given precision.

7. Perform hypothesis testing of the mean and proportion. (CCC 6, 7)

- 7.1 Define null and alternative hypotheses, directional and nondirectional testing, and One-Tail Testing, and significance level.
- 7.2 Use the basic procedures of hypothesis testing to test a mean and proportion where the population standard deviation is known.

8. Use computer software to generate statistical measures and solve applied problems. (CCC 6)

- 8.1 Use a graphing calculator to calculate statistical data.
- 8.2 Use a spread sheet in the calculation and presentation of statistical data.
- 8.3 Recognize and/or use statistical software packages.

EVALUATION CRITERIA

Students will demonstrate proficiency on all Measurable Performance Objectives at least to the 75% level. The final grade will be determined using the College Grading System:

92 – 100	A
83 – 91	B
75 – 82	C
0 – 74	R

Students should refer to the Student Handbook for information on Academic Standing Policy, Academic Honesty Policy, Student Rights and Responsibilities and other policies relevant to their academic progress.