

Specific elements of the competency (043W: To establish the profile of a situation using statistics and

044A: To use digital and computer technologies on the job.)

1. *Validate the data provided*
2. *Determine the type of statistical processing required*
3. *Perform required statistical processing.*
4. *Format and present data in graphical form*
5. *Analyze data and interpret results obtained.*
6. *Use computerized tools for data representation*
7. *Use computerized tools for statistical processing.*

Standard of Performance: The student must be able to:

1. MEASUREMENT & SAMPLING
 - 1.1 explain the terms: population, sample, variable, independence, statistic, parameter
 - 1.2 describe nominal, ordinal, interval and ratio scales of measurements
 - 1.3 classify random, stratified, systematic, cluster and convenience sampling and choose an appropriate method
 - 1.4 determine the precision of a measurement, identify extreme values
2. DATA PRESENTATION AND TREATMENT
 - 2.1 group data into classes and construct a frequency table
 - 2.2 find maximum, minimum values and the range of a data set
 - 2.3 calculate relative frequencies and construct a relative frequency table
 - 2.4 construct and label a bar chart, a histogram, pie chart and a scatter plot (Excel)
3. DESCRIPTIVE STATISTICS
 - 3.1 calculate and interpret measures of central tendency (mean, median, mode) for given data
 - 3.2 calculate and interpret the variance, the standard deviation and the coefficient of variation
4. PROBABILITY AND PROBABILITY DISTRIBUTIONS
 - 4.1 explain the meaning of the terms: sample space, outcome, event, discrete and continuous random variable
 - 4.2 calculate probabilities and describe a probability distribution
 - 4.3 calculate and interpret probabilities for binomial and Poisson distributions (Excel)
 - 4.4 state and apply the principle of critical probability
 - 4.5 calculate a dispersion index and a chi-square statistic to choose a model of dispersion (random, regular or clumped)
 - 4.6 describe a normal distribution, convert observations to z-scores and use a normal distribution to find probabilities
5. ESTIMATION
 - 5.1 apply the Central Limit Theorem and calculate the standard error of the mean
 - 5.2 calculate and interpret a confidence interval using the normal distribution and the Student's t-distribution
 - 5.3 calculate a Lincoln Index to estimate the number of individuals in a population
6. HYPOTHESIS TESTS
 - 6.1 carry out a hypothesis test for one population mean when σ is known and unknown
 - 6.1.1 formulate a null and a research hypothesis for a given situation
 - 6.1.2 choose the type of test (one or two-tailed)
 - 6.1.3 calculate the appropriate test statistic and p-value
 - 6.1.4 formulate and apply a criterion for a decision
 - 6.2 carry out a paired t-test
 - 6.3 carry out a nonparametric Mann-Whitney test
 - 6.4 carry out chi-square tests for goodness of fit and independence in contingency tables
7. ANOVA
 - 7.1 test multi-sample hypothesis: single-factor ANOVA (Excel/Minitab)
 - 7.2 understand the assumptions in ANOVA; non-parametric ANOVA, Kruskal-Wallis test
8. REGRESSION AND CORRELATION
 - 8.1 find and interpret the equation for a regression line for a set of data points (Excel/Minitab)
 - 8.2 find the correlation coefficient for a set of data points and interpret the result (Excel/Minitab)