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Miami-Dade Community College
STA 3164: Statistical Methods II

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Course Description:
Topics include tests of variance, analysis of variance, analysis of covariance, regression, correlation, and non-parametric statistics. *Three Credits*.
Prerequisite: MAC 2312 and STA 2023.

Course Competencies:

Competency 1:   The student will demonstrate an understanding of inferences involving variances by

a.   stating the basic properties of the χ^2-curves.
b.   using the chi-square table in performing a hypothesis test for a population standard deviation when the variable under consideration is normally distributed.
c.   obtaining a confidence interval for a population standard deviation when the variable under consideration is normally distributed.
d.   stating the basic properties of F-curves.
e.   applying the reciprocal property of F-curves and using the F-table in performing a hypothesis test to compare two population standard deviations when the variable under consideration is normally distributed on both populations.
f.   obtaining a confidence interval for the ratio of two population standard deviations when the variable under consideration is normally distributed on both populations.
g.   interpreting the output obtained from a statistical software package applied to tests of variances.

Competency 2:   The student will demonstrate an understanding of analysis of variance by

a.   stating the hypotheses for a one-way analysis of variance (ANOVA).
b.   stating the assumptions for a one-way ANOVA.
c.   constructing an ANOVA table for a one-way ANOVA when there are equal sample sizes.
d.   constructing an ANOVA table for a one-way ANOVA when there are unequal sample sizes.
e.   conducting a one-way ANOVA test.
f.   interpreting the results from a one–way ANOVA test.
g.   stating the hypotheses for a two-way ANOVA.

h. stating the assumptions for a two-way ANOVA.
i. constructing an ANOVA table for a two-way ANOVA.
j. conducting a two-way ANOVA test by testing for an interaction between the two factors and, if necessary, testing for the effect from the row factor and the column factor.
k. interpreting the results from a two-way ANOVA test.
l. interpreting the output obtained from a statistical software package applied to ANOVA tests.

Competency 3:   The student will demonstrate an understanding of analysis of covariance by

a. classifying the independent variables of a response as quantitative and categorical (qualitative).
b. comparing the relationships between the quantitative variables and at least one categorical variable.
c. fitting regressions in the context of multiple classifications.
d. removing bias in observational studies.
e. increasing the precision of randomized experiments.
f. identifying the covariates and developing a covariance model.

Competency 4:   The student will demonstrate an understanding of regression and correlation by

a. drawing a scatter plot for a set of ordered pairs.
b. computing and interpreting a coefficient of correlation.
c. using hypothesis testing to find the significance of the coefficient of correlation.
d. determining the equation of a regression line.
e. computing and interpreting a coefficient of determination.
f. computing and interpreting a standard error of estimate.

Competency 5:   The student will demonstrate an understanding of non-parametric methods by

a. differentiating between parametric and nonparametric statistics.
b. stating advantages and disadvantages of nonparametric methods.
c. performing a hypothesis test using the Sign Test involving two dependent samples.
d. performing a hypothesis test using the Sign Test involving nominal data.
e. performing a hypothesis test using the Sign Test involving the median of a single population.

f. performing a hypothesis test using the Wilcoxon Signed-Rank Test for a population mean or a population median
g. performing a hypothesis test using the Wilcoxon Rank-Sum Test or Mann-Whitney Test for comparing the medians or means of two populations using independent samples
h. interpreting the output obtained from a statistical software package applied to non-parametric tests of means and medians.