DATE OF LAST REVIEW: 01/2014
CIP CODE: 24.0101
SEMESTER: Departmental Syllabus
COURSE TITLE: Statistics
COURSE NUMBER: MATH0115
CREDIT HOURS: 3
INSTRUCTOR: Departmental Syllabus
OFFICE LOCATION: Departmental Syllabus
OFFICE HOURS: Departmental Syllabus
TELEPHONE: Departmental Syllabus
EMAIL: Departmental Syllabus

KCKCC-issued email accounts are the official means for electronically communicating with our students.

PREREQUISITE(S): First Time Placement: See Mandatory Placement Guidelines. Grade of “C” or higher in MATH0105 College Algebra or MATH0108 Pre-Calculus mathematics

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, http://www.kckccbookstore.com/, for the required text(s) and other required material for your particular class. The TI-83 or 84 Series graphing calculator is required.

COURSE DESCRIPTION: Statistics includes the study of basic descriptive statistics, introduction to probability, random variables, special probability functions, random sampling and sampling theory, estimating the mean, hypothesis tests, and linear regression. Students will be expected to use appropriate technology as one tool to achieve competency in Statistics.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.
COURSE OUTLINE:

I. Basic Descriptive Statistics
   A. Dot plot, histogram, stem-and-leaf diagram, box plot
   B. Shape of data
   C. Measures of central tendency
   D. Measures of dispersion
   E. Statistical package or graphing calculator

II. Introduction to Probability
    A. Probability notation
    B. Mutually exclusive events
    C. Independent events
    D. Conditional probabilities

III. Random Variables
     A. Expected value, standard deviation
     B. Discrete random variable

IV. Special Probability Functions
    A. Binomial formula for probability problems
    B. Normal distribution for percent problems
    C. Normal distribution for probability problems

V. Random Sampling and Sampling Theory
   A. Mean
   B. Standard deviation
   C. Normal probability plot
   D. Central Limit Theorem

VI. Estimating the Mean
    A. Known population standard deviation
    B. Unknown population standard deviation
    C. Population proportion

VII. Hypothesis Tests
     A. Known standard deviation
     B. Unknown standard deviation
     C. Sample proportion
     D. Chi-square distribution (optional)
     E. Type I and type II errors (optional)
     F. P-value

VIII. Linear Regression
      A. Calculate
      B. Predictions
      C. Coefficient of determination
EXPECTED LEARNER OUTCOMES:
A. The student will be able to describe basic statistics by organizing and describing data.
B. The student will be able to introduce probability by finding the theoretical probability of an event.
C. The student will be able to use random variables by determining probabilities of a random variable.
D. The student will be able to use special probability functions by using functions to solve probabilities of events.
E. The student will be able to use random sampling and sampling theory by generating distributions for sample means.
F. The student will be able to estimate the mean by using statistics to determine averages of a population.
G. The student will be able to perform hypothesis tests by finding significance.
H. The student will be able to use linear regression by making predictions with linear data.

COURSE COMPETENCIES:
Upon successful completion of this course:

- The student will be able to describe basic statistics by organizing and describing data.
  1. The student will be able to draw a dot plot, histogram, stem-and-leaf diagram, and a box plot for a given set of data.
  2. The student will be able to describe the general shape of data: skewed left, skewed right, normal, or other symmetric.
  3. The student will be able to calculate the measures of central tendency including mean, median, and mode.
  4. The student will be able to calculate the measures of dispersion including range, standard deviation, and interquartile range and explain the meaning of dispersion as it relates to a problem.
  5. The student will be able to use a statistical package or a graphics calculator or a computer to enter data and analyze results.
- The student will be able to introduce probability by finding the theoretical probability of an event.
  6. The student will be able to use probability notation including the “or” condition and the “and” condition.
  7. The student will be able to determine whether or not two events are mutually exclusive.
  8. The student will be able to determine whether or not two events are independent.
  9. The student will be able to calculate conditional probabilities, explain the meaning of conditional probabilities, and use conditional notation.
- The student will be able to use random variables by determining probabilities of a random variable.
  10. The student will be able to determine the expected value and the standard deviation of a discrete random variable.
  11. The student will be able to determine probabilities for a discrete random variable.
The student will be able to use special probability functions by using functions to solve probabilities of events.

12. The student will be able to use the binomial formula to solve probability problems with two outcomes and independent events.
13. The student will be able to use the normal distribution to solve percent problems for normally distributed populations.
14. The student will be able to use the normal distribution to solve probability problems for normally distributed random variables.

The student will be able to use random sampling and sampling theory by generating distributions for sample means.

15. The student will be able to calculate the mean for a distribution of sample means.
16. The student will be able to calculate the standard deviation for a distribution of sample means.
17. The student will be able to perform a normal probability plot and describe the shape of the population distribution based on the plot.
18. The student will be able to analyze the Central Limit Theorem.

The student will be able to estimate the mean by using statistics to determine averages of a population.

19. The student will be able to construct a confidence interval for a population mean with known population standard deviation and explain the meaning in terms of the problem.
20. The student will be able to construct a confidence interval for a population mean with unknown population standard deviation and explain the meaning in terms of the problem.
21. The student will be able to construct a confidence interval for a population proportion and explain the meaning in terms of the problem.

The student will be able to perform hypothesis tests by finding significance.

22. The student will be able to perform a hypothesis test for a sample mean with known population standard deviation.
23. The student will be able to perform a hypothesis test for a sample mean with unknown population standard deviation.
24. The student will be able to perform a hypothesis test for a sample proportion.
25. The student will be able to perform a hypothesis test with more than two categories for procedures using the Chi-square distribution.
26. The student will be able to explain Type I and Type II errors with respect to a problem.
27. The student will be able to calculate the P-value of a hypothesis test and explain the meaning in terms of the problem.

The student will be able to use linear regression by making predictions with linear data.

28. The student will be able to calculate a linear regression equation and explain the meaning in terms of the problem.
29. The student will be able to use a linear regression equation to make predictions about data.
30. The student will be able to calculate the coefficient of determination for a linear regression equation and use the coefficient of determination to explain the strength of the regression equation.

ASSESSMENT OF LEARNER OUTCOMES:
Student progress is evaluated by means that include, but are not limited to, exams, written assignments, and class participation.

SPECIAL NOTES:
Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student’s progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college’s policy on non-discrimination be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact The Director of the Academic Resource Center, in Room 3354 or call: 913-288-7670.