

**Eastern WV Community & Technical College
Master Course Record**

Course Prefix and Number: MTH 225
Course Title: Introduction to Statistics
Recommended Transcript Title: Introduction to Statistics
Date Approved/Revised: 10/16/13; 11/13/14; 10/13/16; 10/5/17
Credit Hours: 3 Contact hours per week (Based on 15 week term): Lecture: 3 Lab:
Prerequisite: MTH 121 or minimum acceptable placement test scores (Math ACT score 19 or higher; SAT math score 500 or higher; or ACCUPLACER Elementary Algebra score of 76 or higher). Corequisite: Pre/Corequisite:
Grading Mode: Letter
Catalog Description: This course is an introduction to the mathematical principles underlying statistical techniques for application in fields of economics, business, education, industry, and the sciences. Course topics include basic probability and statistics with emphasis on methods of gathering data, measures of central tendency, variability, correlation, graphical analysis, and hypothesis testing.
Course Outcomes: <ol style="list-style-type: none"> 1. Define and recognize the fundamental concepts of statistics including data types and sampling techniques 2. Apply methods for organizing and describing a set of data 3. Use probability rules to solve problems 4. Apply the fundamental concepts of random variables and probability distributions 5. Apply methods to estimate values of population parameters and test claims about population parameters 6. Find and interpret regression equations and correlation coefficients 7. Use various types of technology to obtain statistical analysis and interpret the results
Implementation Cycle: Fall
Role in College Curriculum: (Check all that apply) <input checked="" type="checkbox"/> General Education Core: Mathematics – A.A., A.S., A.A.S. <input type="checkbox"/> Technical Core (Specify Program) <input type="checkbox"/> Restricted Elective (Specify Program) <input type="checkbox"/> General Elective <input type="checkbox"/> Workforce Education <input type="checkbox"/> Other (Please specify)
Course Fee: None
Instructor's Qualifications: Master's degree with 18 graduate level mathematics credits.

Expanded Course Description This course is provided to students as an additional transferable Math elective. It will strengthen quantitative and mathematical abilities that will be useful to students in other disciplines.

Expanded course outcomes:

1. Define and recognize the fundamental concepts of statistics including data types and sampling techniques
 - a. Determine whether a value is a statistic or a parameter
 - b. Determine whether a set of data is quantitative or categorical
 - c. Determine whether a value is from a discrete or continuous data set
 - d. Classify the level of measurement of a set of data
 - e. Classify sampling methods
 - f. Recognize whether a sample is a simple random sample
2. Apply methods for organizing and describing a set of data
 - a. Construct and interpret a frequency distribution
 - b. Determine whether a distribution represents a normal distribution
 - c. Construct and interpret various statistical graphs, including histograms, scatterplots, time-series graphs, dotplots, stemplots, bar graphs, pareto charts, pie charts, frequency polygons, and ogives
 - d. Identify the deceptive quality in a graph
 - e. Calculate and interpret central tendency measures
 - f. Calculate and interpret dispersion measures
 - g. Apply the range rule of thumb to distinguish between usual and unusual data values
 - h. Apply the empirical rule
 - i. Apply Chebyshev's Theorem
 - j. Find and interpret z scores
 - k. Find the percentile of a given data value
 - l. Find the value corresponding to a given percentile or quartile
 - m. Find the 5-number summary of a set of data
 - n. Construct a boxplot
3. Use probability rules to solve problems
 - a. Calculate the probability of an event
 - b. Determine whether an event is unlikely
 - c. Construct a tree diagram to determine the sample space
 - d. Interpret a contingency table
 - e. Use the addition rule to calculate "or" probabilities
 - f. Classify a pair of events as disjoint or not disjoint
 - g. Describe the complement of an event and find its probability
 - h. Use the multiplication rule to calculate "and" probabilities
 - i. Classify two events as independent or dependent
 - j. Determine when the cumbersome calculation rule is applicable
 - k. Find the probability of "at least one"
 - l. Calculate conditional probabilities
 - m. Apply the appropriate counting method to determine the number of possible outcomes

4. Apply the fundamental concepts of random variables and probability distributions
 - a. Recognize whether a table gives a probability distribution
 - b. Identify whether a given value is a discrete random variable, continuous random variable, or not a random variable
 - c. Calculate parameters of a probability distribution
 - d. Calculate probabilities using a probability distribution
 - e. Apply the range rule of thumb to distinguish between usual and unusual values of a random variable
 - f. Use probabilities to determine whether results are unusual
 - g. Recognize whether a probability distribution is a binomial distribution
 - h. Calculate probabilities using a binomial distribution
 - i. Calculate parameters of a binomial distribution
 - j. Use a density curve to determine probabilities
 - k. Identify a standard normal distribution
 - l. Distinguish between a standard and a nonstandard normal distribution
 - m. Find the area or probability corresponding to a given z score
 - n. Find the z score corresponding to a given area or probability
 - o. Find critical z values
 - p. Create and interpret sampling distributions
 - q. Apply the central limit theorem
5. Apply methods to estimate values of population parameters and test claims about population parameters
 - a. Find critical z, t, and chi-square values
 - b. Construct and interpret confidence intervals
 - c. Compute the sample size needed to estimate a parameter
 - d. Identify the null hypothesis and alternative hypothesis from a given claim, and express both in symbolic form
 - e. Identify Type I and Type II errors that correspond to a given claim
 - f. Identify the appropriate distribution for a given claim and find the value of the test statistic
 - g. Identify what type of test applies to a given hypothesis
 - h. Find the P-value and critical value(s) for a given claim
 - i. State a conclusion based on a P-value or critical value using the appropriate wording
 - j. Construct and interpret confidence intervals comparing parameters of two populations
 - k. Test a claim involving parameters of two populations
 - l. Use one-way analysis of variance (ANOVA) to test a claim about the equality of means of three or more populations
 - m. Use two-way ANOVA to test for an interaction between two factors and to determine whether each factor has an effect on a set of data
6. Find and interpret regression equations and correlation coefficients
 - a. Calculate and interpret a correlation coefficient
 - b. Find a regression equation
 - c. Determine the best predicted value

- d. Calculate and interpret a prediction interval
 - e. Calculate and interpret a coefficient of determination
 - f. Find a multiple regression equation
 - g. Calculate the adjusted coefficient of determination
 - h. Determine the best multiple regression equation
 - i. Determine which nonlinear regression equation best models a set of data
7. Use various types of technology to obtain statistical analysis and interpret the results

Andrea Williams, Mathematics Faculty

10/5/17

Name, Title

Date

Approved Per LOT Minutes

Dean of Teaching and Learning

Date