COLBY COMMUNITY COLLEGE

MA205 Statistics Syllabus

Course #/Title: MA205 Statistics
Department: Mathematics
Required Text: None.
Instructor: Robin Hanna
Office Hours: on request
Course Placement:

Year: Spring 2011
Credit Hours: 3 Hours
Days/Time: per schedule
Room: per schedule
Phone #: 785.216.0816
Prerequisite: MA178. See Below.
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Statistics (MA205) Overview / Rationale

Statistics is a branch of applied mathematics concerned with the collection, organizing, analyzing and interpretation of quantitative & numeric data. From calculating the batting average of a baseball player to predicting the winner of an election to determining whether or not a new cancer drug is more effective than an old one, statistics is one of the most commonly used forms of upper level mathematics. Indeed, a working knowledge & understanding of statistics is important in virtually all forms of endeavor: business, industry, government, education, social science, engineering, applied science, behavioral science, medicine ... the list goes on. Students who enroll in Statistics need a moderate background in algebra ... the approximate equivalent of MA178.

Course Description

'MA205 Statistics' is an introductory course designed to develop an understanding and working knowledge of statistics and statistical procedures. The course includes units dealing with sampling, graphic and numeric statistics, probability and statistical inference. In addition, the course touches upon both univariate and bivariate statistic procedures. MA205 Elements of Statistics (3 Cr. Hr.). Prerequisite: MA178 (College Algebra) or equivalent. This is an introductory course designed to develop an understanding of probability, frequency distributions, measure of location and variation, probability distributions, confidence intervals, hypothesis testing, tests of significance appropriate to binominal and normal populations, correlations, regression analysis, and analysis of variance.

Purposes

The purpose of 'MA205 Statistics' is to provide students with a general and broad-based knowledge and understanding of statistics. The intent of the course is NOT to emphasize the mathematics and mathematics derivations in statistics, but .... rather ... to emphasize the utility and practicality of statistics in all disciplines.

Statistics Objectives and Competencies

Objective (Defn): something that one's efforts or actions are intended to attain or accomplish; purpose; goal. In education … course objectives are the bits of information, the topics, the facts, the processes, the procedures and the collective subject matter that the learner will study during a course.
The objectives in Statistics include …

1. to develop skills and work problems involving statistical and data terminology, the design of an experiment, and a recognition of the "use and abuses" of statistics.
2. to develop skills and work problems involving describing, exploring and comparing data (frequency tables, histograms, measures of center, measures of variation, measures of position).
3. to develop skills and work problems involving probability.
4. to develop skills and work problems involving probability distributions.
5. to develop skills and work problems involving normal probability distributions.
6. to develop skills and work problems involving sample sizes and estimates.
7. to develop skills and work problems involving hypothesis testing.
8. to develop skills and work problems involving correlation and regression.
9. to develop skills and work problems involving inferences from two samples.

Competency (Defn): the quality of being competent; the possession of required skills, knowledge, qualifications or capacities. In education … competencies refer to measurable skills, knowledge, qualifications and/or capacities that a student should acquire and possess at the end of a unit of study or at the end of the course.

The competencies in Statistics include …

Upon successful completion of this course the student should be able to:

1. Recognize basic concepts about the nature of data.
2. Have fluency and the ability to correctly use the language and vocabulary associated with statistics.
3. Identify the elements of good experimental design.
4. Visually display the nature of a distribution (make a frequency table, make a histogram).
5. Calculate measures of center for a set of data (mean, median, mode).
6. Calculate measures of variation for a set of data (range, standard deviation).
7. Find z-scores (standard scores) and percentages for items in a data set.
8. Find and represent in correct notation probabilities of simple events.
9. Calculate probability combining two or more simple events [P(A and B), P(A or B)].
10. Be able to find a factorial, combination value and permutation value (counting values).
11. Calculate measures of center and variation for a probability distribution.
12. Calculate measures of center and variation for a binomial distribution.
13. Apply basic methods for working with normal distribution (be able to work with a standard normal distribution table).
14. Find z-scores given a probability (normal distribution table).
15. State and use properties of the Central Limit Theorem.
16. Construct and interpret a critical value, margin of error, and a confidence interval of/for a population mean.
17. Construct and interpret a critical value, margin of error, and a confidence interval of/for a population proportion.
18. Test claims about population means.
19. Test claims about population proportions.
20. Calculate the strength of a linear relationship (Pearson Correlation Coefficient).
21. Construct a regression line.
22. Test a claimed distribution fits a data set's distribution.

Statistics Course Outline

The Statistics course study will follow the objectives/competencies listed above.

Expectations

It is my genuine desire and goal (as your teacher) that you learn the class material, that you do well in the class, and that you pass the course (preferably with a high grade). I want you to be successful ... and to that end … I will work to do my best to encourage, assist and help you in anyway that I can. *I also recognize that I need your help to achieve this goal …*
I need you to attend class regularly and faithfully, to come to class prepared, to be alert and attentive during classroom presentations, and to actively participate in classroom discussions and activities. I need you to independently complete problem assignments each class period and have them available the next class period. I need you to communicate to me any failure to understand a lecture or assignment. ***(Success in the class may be gained by/from active participatory learning, attending class, studying, doing assigned work, asking questions and seeking help when difficulties arise. These are things you must provide to achieve success.)***

Evaluation / Grading

Assignments: Problems for each class ... worth approximately thirty percent of the final grade.
Tests and/or Quizzes: Six Unit Tests … worth approximately seventy percent of the final grade.

Grading: 90% and up A
80% up to 90% B
70% up to 80% C
60% up to 70% D
Below 60% F

Instructional Methods

Mathematics is a "participatory activity" ... **the more you do**, the more you learn & master. In general, new concepts/ skills/procedures will be presented, discussed and demonstrated in the classroom ... with student-teacher interaction being desirable. Problems that reinforce and expand upon presentations will be assigned ... and these are expected to be completed by the next class period. Problems will be checked in class (the class period after they are assigned) ... with adequate opportunities for "follow-up" and clarification(s).

Disclaimer

I reserve the right to change any information contained in this document, when necessary, with adequate notice given to the student. Notice shall be given in the classroom during class. No other notice is required. It is the students' responsibility to keep up with any changes, modifications, adjustments or amendments that are made to this document.