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Alabama
Department of
Postsecondary Education

Representing Alabama's Public Two-Year College System

Jefferson State Community College

MTH 110
Finite Mathematics

I. MTH 110 Finite Mathematics - 3 Semester Hours

Core Area III, Code A

II. Course Description

This course is intended to give an overview of topics in finite mathematics together with their applications, and is taken primarily by students who are not majoring in science, engineering, commerce, or mathematics (i.e. students who are not required to take Calculus). This course will draw on and significantly enhance the student's arithmetic and algebraic skills. The course includes sets, counting, permutations, combinations, basic probability (including Baye's Theorem) and introduction to statistics (including work with Binomial Distributions and Normal Distributions), matrices and their applications to Markov chains and decision theory. Additional topics may include symbolic logic, linear models, linear programming, the simplex method and applications.

III. Prerequisite

All core mathematics courses in Alabama must have as a minimum prerequisite high school Algebra I, Geometry, and Algebra II with an appropriate mathematics placement score. An alternative to this is that the student should successfully pass with a C or higher in Intermediate College Algebra.

IV. Textbook

Finite Mathematics, For the Managerial, Life, and Social Sciences, Tan 11th Ed.
Brooks/Cole, Cengage Learning, 2011.

V. Course Objectives

The objective of this course is to provide the non-calculus mathematics needed for students in many disciplines. This course shows through applications the relevance of mathematics to both real life and future courses in many disciplines. It also provides a general mathematics background for students who need a terminal core mathematics course. The student will develop an understanding of the concepts, develop competent skills, and demonstrate applications in the following areas.

1. Analytic interpretation of linear systems, matrix algebra, and set theory.
2. Analytic interpretation of measurements of central tendency, probability, and statistics.

VI. Course Outline of Topics

A. This course shall include the following topics as a minimum.

1. Applications of linear functions
 2. Equations of straight lines
 3. Two lines: relating the geometry to the equations
 4. Systems of linear equations
 5. Linear systems having one or no solutions
 6. Linear systems having many solutions
 7. Matrix algebra
 8. Matrix multiplication and applications
 9. The inverse of a matrix
 10. Counting techniques
 11. Sets
 12. Application of Venn diagrams
 13. The multiplication principle
 14. Permutations
 15. Combinations
 16. Basic concepts of probability
 17. Outcomes with unequal probability; odds
 18. Discrete random variables and expected value
 19. Additional topics in probability
 20. Conditional probability
 21. Multiplication rules for probability; independent events
 22. Bayes' Theorem
 23. Statistics
 24. Measures of central tendency
 25. Measuring the dispersion of data
 26. Continuous random variables and the normal distribution
 27. The normal approximation to the binomial distribution
 28. Markov chains
 29. Regular Markov chains
 30. Absorbing Markov chains
- B. Optimal topics may include the following.
1. Linear modeling
 2. Regression and correlation
 3. Linear programming

4. Linear inequalities in two variables
5. Solving linear programming problems graphically
6. Slack variables and pivoting
7. The simplex algorithm

VII. Evaluation and Assessment

Evaluation and assessment techniques may include any or all of the following.

Exams

Projects

Homework

Computer assignments

Participation

Grades will be given based upon A = 90 – 100%, B = 80 – 89%, C = 70 – 79%, D = 60 – 69%, and F = below 60%.

VIII. Class Activities

- A. Lecture
- B. Recitation
- C. Discussion
- D. Individual instruction
- E. Testing

IX. GENERAL COURSE COMPETENCIES

- A. The student will acquire knowledge of mathematical terminology.
- B. The student will be able to apply knowledge of algebra.
- C. The student will acquire knowledge of sets and counting.
- D. The student will acquire knowledge of probability and statistics.

X. COURSE OBJECTIVES STATED IN PERFORMANCE TERMS

- A. The student will demonstrate knowledge of mathematical terminology as measured by his/her ability to
 1. recall the meaning of the concepts of and concepts related to the following in order to work problems requiring a knowledge of these terms:

a. Bayes' Theorem	h. probability
b. Cartesian coordinate system	i. statistics
c. linear function	j. binomial distribution
d. matrices and matrix operations	k. normal distribution
e. sets and set operations	l. measures of dispersion
f. permutation	m. measures of central tendency
g. combination	
 2. state whether a line has a positive, negative, zero, or nonexistent slope.

- B. The student will demonstrate knowledge of algebra by his/her ability to
 1. calculate:

- a. the distance between two given points, stating and using the appropriate formula
- b. the slope of the line passing through two given points, stating and using the appropriate formula.
2. express a linear equation in slope-intercept form.
3. graph linear functions.
4. perform matrix addition, subtraction, and multiplication.
5. determine the scalar product and the transpose of a matrix.
6. determine the inverse of a given matrix, if it exists.
7. use matrices to solve systems of linear equations.
8. use Markov chains for problem solving.
- C. The student will demonstrate knowledge of sets and counting by his/her ability to:
 1. perform the union and intersection of given sets.
 2. draw a tree diagram displaying possible outcomes of an event.
 3. use the generalized multiplication principle.
 4. classify a given problem as a permutation or a combination.
 5. determine the number of permutations of an event.
 6. determine the number of combinations of an event.
- D. The student will demonstrate knowledge of probability and statistics by his/her ability to
 1. determine the sample space for a given experiment.
 2. find the probability distribution associated with a given set of data.
 3. use the laws of probability to find the probability of a given event in an experiment.
 4. find the expected value of a random variable X from a given probability distribution.
 5. calculate the following measures of central tendency from a given set of data:
 - a. mean
 - b. median
 - c. mode
 6. calculate the following measures of dispersion of data from a given probability distribution:
 - a. variance
 - b. standard deviation
 7. use normal distributions to solve applied problems.
 8. use binomial distributions to solve applied problems.

XI. Attendance

Students are expected to attend all classes for which they are registered. Students who are unable to attend class regularly, regardless of the reason or circumstance, should withdraw from that class before poor attendance interferes with the student's ability to achieve the objectives required in the course. Withdrawal from class can affect eligibility for federal financial aid.

XII. Statement on Discrimination/Harassment

The College and the Alabama State Board of Education are committed to providing both employment and educational environments free of harassment or discrimination related to an individual's race, color, gender, religion, national origin, age, or disability. Such harassment is a violation of State Board of Education policy. Any practice or behavior that constitutes harassment or discrimination will not be tolerated.

XIII. Americans with Disabilities

The Rehabilitation Act of 1973 (Section 504) and the Americans with Disabilities Act of 1990 state that qualified students with disabilities who meet the essential functions and academic requirements are entitled to reasonable accommodations. It is the student's responsibility to provide appropriate disability documentation to the College. The ADA Accommodations office is located in FSC 300 (205-856-7731).