MATH-1470: MODERN MATHEMATICS FOR BUSINESS AND SOCIAL SCIENCE I

Cuyahoga Community College

Viewing: MATH-1470 : Modern Mathematics for Business and Social Science I

Board of Trustees:
September 2019

Academic Term:
Fall 2022

Subject Code
MATH - Mathematics

Course Number:
1470

Title:
Modern Mathematics for Business and Social Science I

Catalog Description:
First of two-semester sequence. Topics include functions, mathematics of finance, linear systems, matrix algebra and linear programming with applications in business and social sciences.

Credit Hour(s):
4

Lecture Hour(s):
4

Lab Hour(s):
0

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
MATH-0965 Intermediate Algebra, or qualified Math Placement, or departmental approval: equivalent coursework.

Note: MATH-1200 or 1280 completed prior to Fall 2016, or MATH-1270 completed prior to Summer 2017 will also meet prerequisite requirements for this course.

Outcomes

Course Outcome(s):
Analyze, define, and utilize functions of various types.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):
1. Define functions and function notation.
2. Determine the domain and range of a function.
3. Graph linear and other basic functions and use the vertical line test.
4. Use linear functions to solve application problems relating to cost/revenue/profit, marginal analysis, break-even analysis, and supply/demand.

5. Graph quadratic functions, including determining the vertex, intercepts, and axis of the parabola.
6. Use quadratic functions to solve application problems relating to cost/revenue/profit, break-even analysis, and supply/demand.

Course Outcome(s):

Analyze, define, solve, and utilize exponential and logarithmic equations and functions.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):

1. Define, graph, and evaluate exponential functions.
2. Apply exponential functions to exponential growth and decay problems.
3. Define, utilize the properties of, and evaluate logarithms.
4. Graph and apply logarithmic functions.
5. Solve exponential equations, logarithmic equations, and their applications.

Course Outcome(s):

Interpret, evaluate, and apply various formulas related to the mathematics of finance.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):

1. Interpret and compute simple interest.
2. Compute future value, present value, and interest rate using simple interest.
3. Interpret and compute compound interest, including continuous compounding.
4. Compute future value, present value, and interest rate using compound interest, including continuous compounding.
5. Interpret and compute effective rate (annual percentage yield).
6. Compute future value and present value of ordinary annuities and annuities due.
7. Compute the necessary payment for amortization and sinking funds.

Course Outcome(s):

Analyze, graph, solve, and apply systems of linear equations, including utilization of matrices.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):

1. Solve systems of two linear equations in two variables by graphing, substitution, and elimination.
2. Solve systems of linear equations in two or more variables using the Gauss-Jordan Method.
3. Solve application problems using systems of linear equations.
4. Define an m x n matrix, a row matrix, and a column matrix.
5. Perform basic operations on matrices including addition, subtraction, scalar multiplication, and multiplication.
6. Interpret and compute the inverse of a matrix.
7. Use the inverse of a matrix to solve a system of linear equations.

Course Outcome(s):

Analyze, graph, solve, and apply systems of linear inequalities.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):

1. Graph linear inequalities and systems of linear inequalities in two variables.
2. Solve linear programming problems and applications graphically using the Corner Point Theorem.
3. Solve linear programming problems and applications in Standard Maximum Form using the Simplex Method.

Methods of Evaluation:

1. Periodic exams.
2. Quizzes.
3. Homework.
4. In class collaborative work.
5. Comprehensive final exam.

Course Content Outline:

1. Functions
   a. Definition of a function and function notation
   b. Domain and range of a function
   c. Graphs of linear and other basic functions and the vertical line test
   d. Applications of linear functions relating to cost/revenue/profit, marginal analysis, break-even analysis, and supply/demand
   e. Graphs of quadratic functions, vertex, intercepts, and axis of the parabola
   f. Applications of quadratic functions relating to cost/revenue/profit, break-even analysis, and supply/demand
2. Exponential and logarithmic equations and functions
   a. Exponential functions and graphs
   b. Exponential growth and decay
   c. Evaluating logarithms and properties of logarithms
   d. Logarithmic functions, graphs, and applications
   e. Exponential equations, logarithmic equations, and applications
3. Mathematics of finance
   a. Simple interest
   b. Future value, present value, and interest rate for simple interest
   c. Compound interest, including continuous compounding
   d. Future value, present value, and interest rate for compound interest, including continuous compounding
   e. Effective rate
   f. Future value and present value of ordinary annuities and annuities due
   g. Amortization and sinking funds
4. Systems of linear equations and matrices
   a. Systems of two linear equations in two variables: solve by graphing, substitution, and elimination
   b. Systems of linear equations in two or more variables: Gauss-Jordan Method
   c. Applications of systems of linear equations
   d. m x n matrix, row matrix, and column matrix
   e. Addition, subtraction, scalar multiplication, and multiplication of matrices
   f. Inverse of a matrix
   g. Solving systems of linear equations using the inverse of a matrix
5. Systems of linear inequalities
   a. Graphing linear inequalities and systems of linear inequalities
   b. Solving linear programming problems and applications graphically using the Corner Point Theorem
   c. Solving linear programming problems and applications in Standard Maximum Form using the Simplex Method

Resources

Lial, Margaret L., Raymond Greenwell, and Nathan Ritchey. *Finite Mathematics and Calculus with Applications*. 10th ed. Boston, MA: Pearson/Addison Wesley, 2016.

Lial, Margaret L., Thomas Hungerford, John P. Holcomb, and Bernadette Mullins. *Mathematics with Applications in the Management, Natural, and Social Sciences*. 12th ed. Boston, MA: Pearson, 2019.

Tan, Soo T. *Finite Mathematics for the Managerial, Life, and Social Sciences*. 12th ed. Boston, MA: Cengage Learning, 2018.

Barnett, Raymond A., Michael R. Ziegler, Karl E. Byleen, and Christopher J. Stocker. *College Mathematics for Business, Economics, Life Sciences and Social Sciences*. 14th ed. New York, NY: Pearson, 2019.

Pearson. *MyMathLab*. Continuously updated. New York, NY: Pearson, 2020.

Instructional Services

OAN Number:
Ohio Transfer 36 TMMSL

Top of page
Key: 4538