

University of Houston-Downtown

Course Prefix, Number, and Title: MATH 1324- Mathematics for Business and Social Sciences

Credits/Lecture/Lab Hours: 3/3/0

Foundational Component Area: Mathematics

Prerequisites: Prerequisites: A grade of C or better in MATH 1300, TSI MATH score 350, TSI MATH complete, or TSI MATH exempt.

Co-requisites: None

Course Description: The application of common algebraic functions, including polynomial, exponential, logarithmic, and rational, to problems in business, economics, and the social sciences are addressed. The applications include mathematics of finance, including simple and compound interest and annuities; systems of linear equations; matrices; and linear programming.

TCCNS Number: MATH 1324 Mathematics for Business and Social Sciences

Demonstration of Core Objectives within the Course:

Assigned Core Objective	Learning Outcome Students will be able to:	Instructional strategy or content used to achieve the outcome*	Method by which students' mastery of this outcome will be evaluated
Critical Thinking Communication Empirical & Quantitative Reasoning	Describe and communicate mathematical information verbally, numerically, graphically, and symbolically.	<p>Content: Linear equations and graphs; functions and graphs; simple and compound interest; annuities, matrix operations, linear programming (LP)</p> <p>Instructional Strategies: Ask students to describe and interpret different function representations, slope, x- and y-intercepts, vertex; simplify/evaluate symbolic expressions; graph functions; solve equations; interpret interest/annuity formulas; model, and solve LP optimization problems, and interpret their solutions</p>	Homework assignments (either written and/or online in MyLab Math), in-class discussions and activities, quizzes (optional), and exams (including final exam)

<p>Critical Thinking Empirical & Quantitative Reasoning</p>	<p>Use appropriate mathematical techniques to model situations from a variety of settings, including real-world applications in generalized mathematical forms.</p>	<p>Content: Functions and graphs; simple and compound interest; annuities, matrix operations, linear programming (LP) Instructional Strategies: Ask students to model, solve, and interpret real-world problems using functions, graphs, matrices, and linear programming optimization models.</p>	<p>Homework assignments (either written and/or online in MyLab Math), in-class discussions and activities, quizzes (optional), and exams (including final exam)</p>
<p>Critical Thinking Empirical & Quantitative Reasoning</p>	<p>Interpret mathematical models, such as formulas, graphs, tables, and schematics, and draw inferences from them.</p>	<p>Content: Functions and graphs; simple and compound interest; annuities, linear programming (LP) Instructional Strategies: Ask students to interpret linear, quadratic, polynomial, exponential and logarithmic functions that occur in applications, including financial applications of interest and annuity value; interpret graph representations of models, including those used to solve LP optimization problems</p>	<p>Homework assignments (either written and/or online in MyLab Math), in-class discussions and activities, quizzes (optional), and exams (including final exam)</p>
<p>Critical Thinking Empirical & Quantitative Reasoning</p>	<p>Discern relationships and patterns in quantitative data to arrive at informed conclusions.</p>	<p>Content: Functions and graphs; simple and compound interest; annuities, matrix analysis, linear programming (LP) Instructional Strategies: Ask students to model data using functions, matrices, and graphs, for the purpose of solving problems, drawing conclusions from the data and models, and solving problems</p>	<p>Homework assignments (either written and/or online in MyLab Math), in-class discussions and activities, quizzes (optional), and exams (including final exam)</p>

<p>Critical Thinking Empirical & Quantitative Reasoning</p>	<p>Utilize appropriate technology to enhance mathematical thinking and understanding, to solve mathematical problems, and to judge the reasonableness of the results.</p>	<p>Content: Functions and graphs; Linear regression, simple and compound interest; annuities, linear programming (LP) Instructional Strategies: Ask students to use graphing calculators or similar software (e.g. DESMOS) to solve and interpret solutions to problems. Microsoft Excel can also be used for this purpose.</p>	<p>Homework assignments (either written and/or online in MyLab Math), in-class discussions and activities, quizzes (optional), and exams (including final exam) Use of Microsoft Excel and DESMOS graphing calculator software</p>
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Additional Course Outcomes:

- Interpret and use functional notation, express concepts and properties in functional notation, recognize and apply different types of functions including linear, polynomial, rational, exponential and logarithmic;
- Determine key properties of functions from various representations, and recognize common properties of different functions;
- Solve linear and quadratic equations, and linear inequalities, and interpret solutions;
- Perform operations with matrices and apply matrix methods to systems of linear equations;
- Formulate and solve linear programming problems by graphical methods; and
- Compute simple and compound interest and annuities (present and future values).

Course Outline:

Unit I – Linear Equations and Graphs; Functions and Graphs

A treatment of algebraic topics including linear equations and inequalities, graphs and lines, linear regression, functions, graphs and transformations, quadratic functions, polynomial and rational functions, exponential functions, and logarithmic functions

Unit II – Mathematics of Finance

The unit begins with a brief discussion of simple interest followed by a more detailed discussion of compound interest and effective interest rates. Future and present value of an annuity are then presented, along with discussion of sinking fund payments and amortization payments. Emphasis is on applications.

Unit III – Matrix Theory

Briefly review the solution of systems of linear equations with two variables using algebraic methods. Next, matrices are introduced as a means of solving linear systems. Gauss-Jordan elimination for solving linear systems of equations is then presented. The basic operations of matrices, including multiplication of matrices, are introduced. Matrix inverses and finding solutions of linear systems using the inverse of the coefficient matrix follow. Emphasis is on applications.

Unit IV – Linear Programming

Briefly review graphing systems of linear inequalities with two variables. Linear programming models and the solution of linear programming problems by the graphical method are then introduced. Emphasis is on applications.

Grading/Course Content which Demonstrates Student Achievement of Core Objectives:

The grading scale is as follows: 100-90% = A; 89-80% = B; 79-70% = C; 69-60% = D; 59-0% = F.

Summary of Course Exams, Quizzes, Assignments and Final	
Assignment	Suggested % of Grade
Three in-class exams	45%
Homework (MyLab Math and/or written)	10%
Class participation/in-class activities	10%
Final Exam (comprehensive)	25%
Signature Assignment #1: Quantitative/Empirical	5%
Signature Assignment #2: Visual Communication	5%
Total	100%