

COURSE SYLLABUS FOR MATH FOR BUSINESS & ECONOMICS (MATH 1305)

Course Objectives:

This course aims to cover mathematical concepts such as functions, graphs, linear systems, optimization, and their applications in business, finance, and economics. By mastering these topics, students will:

1. Represent and solve problems using mathematics.
2. Communicate quantitative results effectively.
3. Appreciate the limitations and strengths of mathematical models.

Prerequisites: none

Textbook: *Applied Mathematics for the Managerial, Life, and Social Sciences (7e)* by Tan. The whole package including the eBook and online homework assignments must be purchased on WebAssign.

Course Content

Chapter 2 The Cartesian Coordinate System. Equations of Lines. Linear Functions. Quadratic Functions. Functions & Their Graphs. The Algebra of Functions. Functions & Mathematical Models. The Method of Least Squares.

Chapter 3 Exponential Functions. Logarithmic Functions. Exponential Functions as Mathematical Models.

Chapter 4 Compound Interest. Annuities. Amortization.

Chapter 5 Systems of Linear Equations. Systems of Linear Equations: Unique Solutions. Underdetermined & Overdetermined Systems.

Chapter 6 Graphing Systems of Linear Inequalities. Linear Programming Problems.

Chapter 9 The Derivative. Basic Rules of Differentiation. Product & Quotient Rules. The Chain Rule. Differentiation of Exponential & Logarithmic Functions. Marginal Functions in Economics.

Chapter 10 Optimization

Additional Topics Curve Fitting and Regression using Spreadsheets & Numeracy

Tentative schedule

First Day of Class (1/16)

Week 1 T 1/21 (canceled) Th 1/23	Fundamentals of Algebra & Mathematical Modeling <ul style="list-style-type: none">• Functions & Graphs & Algebra• Equations of Lines & Linear Models• Quadratic Models
Week 2 T 1/28 Th 1/30	Mathematical Modeling (cont.) <ul style="list-style-type: none">• Exponential Functions• Logarithmic Functions
Week 3 T 2/4 Th 2/6	Mathematical Modeling (cont.) <ul style="list-style-type: none">• Introduction to Google spreadsheet Numeracy

	<ul style="list-style-type: none"> • Unit Conversions and Order of Magnitude • Percentage Formulas • Absolute vs. Relative Changes • Average Values
Week 4 T 2/11 Th 2/13	Review Test 1 Early Alert Grades Due (2/19)
Week 5 T 2/18 Th 2/20	Mathematics of Finance <ul style="list-style-type: none"> • Simple Interest • Compound Interest • Effective Rate of Interest
Week 6 T 2/25 Th 2/27	Mathematics of Finance <ul style="list-style-type: none"> • Annuities, Present/Future Values • Amortization, Sinking Funds
Week 7 T 3/4 Th 3/6	Systems of Linear Equations <ul style="list-style-type: none"> • Solve systems of equations by graphing • Solve systems of equations by substitution • Solve systems of equations by elimination • Large systems of linear equations: matrices (row reduced echelon form) • How to use Desmos Matrix Calculator to find the reduced row echelon form (rref) of an augmented matrix • Application: Linear Least Squares
Week 8 T 3/18 Th 3/20	Least Squares Analysis using Spreadsheets <ul style="list-style-type: none"> • R squared value • Data Fitting & Prediction • Why You Should Use a Logarithmic Scale (Log Scale) for Stock Price Charts Mid-Term Grades Due (3/18)
Week 9 T 3/25 Th 3/27	Review Test 2 Last Day UG Course Withdrawal (4/2)
Week 10 T 4/1 Th 4/3	<i>Slide Preparation for Group Project</i> (Groups of 3 - 4 students: each chooses a topic within Week 5 to Week 8)
Week 11 T 4/8	<i>Slide-based Presentation on Poster Board</i> to high school students and faculty judges from Finance and Business Analytics, Business

Th 4/10	Administration, Accounting, Economics, and Mathematics.
Week 12 T 4/15 Th 4/17	Linear Programming (Optimization) <ul style="list-style-type: none"> • Define an objective function • Define constraint equations • Define feasible regions and determine corner points • Solve linear programming problems using a graph • Use Desmos to solve a linear programming problem
Week 13 T 4/22 Th 4/24	Derivative <ul style="list-style-type: none"> • Explore Derivative as Slope of Tangent Line • Different Interpretations of the Derivative • Basic Differentiation Rules: Power Rule, Product and Quotient Rules • Marginal Functions (Revenue, Cost, and Profit) Chain Rule <ul style="list-style-type: none"> • Differentiation Rules of Polynomial, Exponential, and Logarithmic Functions
Week 14 T 4/29 Th 5/1	Optimization using Derivative <ul style="list-style-type: none"> • First Derivative Test • Second Derivative Test Last Day of Class (5/1) Reading Days (5/5 & 5/6)
Week 15	Review Session (Outside of Class) Date: Tuesday 5/6 (1:30 - 2:30 PM) Location: MMH 140 Final Common Exam (Topics: Linear Programming, Derivative: Applications & Optimization) Date: Saturday, May 10 Location: Section 1 (RCC 319) & Section 2 (RCC 320) Grades Due by 5:00 PM (5/19)