Montgomery County Community College
MAT 140
Finite Mathematics for Business
3-3-0

COURSE DESCRIPTION:
A course in finite mathematics with special emphasis on applications to business and related fields. Topics include linear and quadratic equations with applications involving supply, demand, revenue, cost, profit and break-even points; matrices and systems of linear equations; graphing; linear programming; simplex method; mathematics of finance; and model building. Classroom instruction and programs will be presented using a TI-84 Plus.

REQUISITE(S):
Previous Course Requirements
- MAT 100 Intermediate Algebra with a minimum grade of "C"

Concurrent Course Requirements
None

COURSE COMMENTS
* Quantitative Reasoning, Algebra, and Statistics Accuplacer Test Score of 251 or higher or an Advanced Algebra and Functions Accuplacer Test Score of 237-275.

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Write linear cost and revenue functions.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
2. Write linear and quadratic profit functions.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
3. Find break-even points for linear and quadratic function applications.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
4. Find market equilibrium, given linear or quadratic supply and demand functions.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
5. Graph linear and quadratic supply, demand, cost, revenue and profit functions.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
6. Interpret marginal revenue, marginal cost, and marginal profit as slope of linear functions.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
7. Find the maximum profit for a quadratic profit function.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
8. Perform the basic operations of addition, subtraction, scalar multiplication, and multiplication of matrices.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
9. Use Gauss-Jordan elimination to solve a system of linear equations without a calculator and with the calculator using "rref."	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
10. Model a problem by writing a system of equations and solve the system by using the inverse of a matrix.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
11. Solve both an open and closed Leontief Input-Output model.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
12. Solve linear programming problems graphically.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
13. Solve maximation linear programming problems using the simplex method with the program "simplex" on the calculator.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
14. Solve minimization linear programming problems using the dual maximization problem.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
15. Compute simple and compound interest using the appropriate formulae.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
16. Find the present and future value of ordinary annuities using the calculator.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
17. Find the future value of annuities due using the calculator.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
18. Compute mortgage payments and make a mortgage amortization table using the calculator.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
19. Apply Markov Chains to model changes in consumer preferences.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects
20. Access information from websites and literature and synthesize the information in order to analyze mathematical models.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes Projects	Exams Quizzes Homework Projects

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria*.

SEQUENCE OF TOPICS:
1. Solution of Linear Equations, Functions
2. Writing and Graphing Equations of Lines
3. Applications in Business and Economics
4. Matrices: Transposes and Sums
5. Multiplication of Matrices
6. Gauss-Jordan Elimination
7. Inverse of a Square Matrix
8. Leontief Input-Output Model
9. Markov Chains
10. Linear Inequalities
11. Linear Programming: Graphical Methods
12. Simplex Method, Using the Calculator Program

13. Solution of Quadratic Equations
14. Graphing Parabolas
15. Business Applications of Quadratic Functions
16. Special Functions and Their Graphs
17. Simple Interest
18. Compound Interest
19. Mathematics of Finance
20. At least four of the topics must utilize excel.

LEARNING MATERIALS:

Textbook:

Harshbarger, Ronald J. & Reynolds, James J. (2015). *Mathematical Applications for the Management, Life, and Social Sciences* (11th ed.). Cengage.

Required Materials:

TI-84+ Graphing Calculator. If a student has a TI-83+, he/she does not need to buy a TI-84+.

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL: June, 1998

Prepared by:	Barbara Lontz	Date:	4/1998
Revised by:	Fay Sewell	Date:	1/2000
Revised by:	Thomas Moyer	Date:	1/2004
Revised by:	Paul Winterbottom	Date:	6/2007

Revised by:	Mark McFadden	Date:	2/1/2013
VPAA/Provost or designee Compliance Verification:			
	Victoria L. Bastecki-Perez, Ed.D.	Date:	5/23/2013

Revised by:	Walter Hunter	Date:	9/2/2015
VPAA/Provost or designee Compliance Verification:			
	Victoria L. Bastecki-Perez, Ed.D.	Date:	9/3/2015

Revised by:	Marion Graziano/Debbie Dalrymple	Date:	8/2/2017
VPAA/Provost or designee Compliance Verification:		Date:	8/24/2017

This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.