

# MATH 016: FINITE MATHEMATICS

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**Originator**

dkleinfelter

**Justification / Rationale**

This course develops students' quantitative reasoning abilities in the context of meaningful, relevant, and interesting applications. It also provides mathematical skills needed for certain majors (such as economics, business management, and social sciences) at some four-year institutions.

**Effective Term**

Spring 2022

**Credit Status**

Credit - Degree Applicable

**Subject**

MATH - Mathematics

**Course Number**

016

**Full Course Title**

Finite Mathematics

**Short Title**

FINITE MATH

**Discipline****Disciplines List**

Mathematics

**Modality**

Face-to-Face

100% Online

**Catalog Description**

This course covers linear functions, systems of linear equations, matrices, linear programming, mathematics of finance, sets and Venn diagrams, combinatorial techniques and introduction to probability as well as applications from business, economics, social science, and personal finance. This course is transferable (C-ID Math 130) and satisfies the math general education requirement and is an excellent course for students who don't need any additional math courses for their degree.

**Schedule Description**

Finite mathematics applied to problems in business, economics, social science, and personal finance.

Prerequisite: MATH 040 or MATH 049 or MATH 045

Advisory: ENG 061

**Lecture Units**

3

**Lecture Semester Hours**

54

**In-class Hours**

54

**Out-of-class Hours**

108

**Total Course Units**

3

**Total Semester Hours**

162

**Prerequisite Course(s)**

MATH 040 or MATH 049 or MATH 045

Advisory: ENG 061

**Required Text and Other Instructional Materials****Resource Type**

Book

**Open Educational Resource**

Yes

**Author**

Bloom, Roberta and Sekhon, Rupinder

**Title**

Applied Finite Mathematics

**Edition**

Third

**Publisher**<http://www.deanza.edu/faculty/bloomroberta/documents/AppliedFiniteMath-3ed-Current.pdf>**Year**

2016

**College Level**

Yes

**Resource Type**

Book

**Open Educational Resource**

No

**Author**

Lial M., Greenwell R., Ritchey N.

**Title**

Finite Mathematics

**Edition**

11

**Publisher**

Pearson

**Year**

2016

**College Level**

Yes

**ISBN #**

978-0-321-97943-8

**Class Size Maximum**

45

**Entrance Skills**

Demonstrate that the key characteristic of a linear model is its constant rate of change.

**Requisite Course Objectives**

MATH 040-Comprehend that the key characteristic of a linear model is its constant rate of change.

MATH 045-Comprehend that the key characteristic of a linear model is its constant rate of change and interpret slope as a rate of change and relate slope to topics from social sciences.

MATH 049-Comprehend that the key characteristic of a linear model is its constant rate of change. Recognize when a table, graph or equation is linear.

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**Entrance Skills**

Develop a linear model in symbolic, graphical, or tabular form.

**Requisite Course Objectives**

MATH 040-Create a linear model in the form of a table, graph, or equation.

MATH 045-Create a linear model in the form of a table, graph, or equation, including a line of best fit for a set of given points.

MATH 049-Create and comprehend a linear model in the form of a table, graph, or equation from a verbal description, using the rule of 4.

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**Entrance Skills**

Construct the equation of a line and use it to solve problems with a constant rate of change.

**Requisite Course Objectives**

MATH 040-Find the equation of a line and apply it to solve problems with a constant of change.

MATH 045-Find the equation of a line and apply it to solve financial and social sciences problems involving constant rates of change.

MATH 049-Find the equation of a line and apply it to solve problems with a constant rate of change.

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**Entrance Skills**

Find solutions of systems of linear equations in two and three variables.

**Requisite Course Objectives**

MATH 040-Solve  $2 \times 2$  and  $3 \times 3$  systems of linear equations.

MATH 045-Solve  $2 \times 2$  and  $3 \times 3$  systems of linear equations and solve application problems from social sciences.

MATH 049-Solve  $2 \times 2$  and  $3 \times 3$  systems of linear equations apply this to model circles, parabolas lines from given data, as a lead into generalizing to least squares methods in the Calculus sequence.

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**Entrance Skills**

Solve two-dimensional systems of linear inequalities graphically.

**Requisite Course Objectives**

MATH 040-Graph systems of linear inequalities in two dimensions.

MATH 045-Graph systems of linear inequalities in two dimensions and find the coordinates of points of intersection, including application problems similar to examples from linear programming.

MATH 049-Graph systems of linear inequalities in two dimensions. Introduction to non-linear inequalities.

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**Entrance Skills**

Understand and manipulate rational exponents and Nth roots.

**Requisite Course Objectives**

MATH 040-Comprehend and manipulate rational exponents and Nth roots.

MATH 045-Comprehend and manipulate rational exponents and Nth roots, including those used in financial mathematical formulas such as compound interest.

MATH 049-Comprehend and manipulate rational exponents and Nth roots, and solve radical equations.

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**Entrance Skills**

Demonstrate an understanding that the key characteristic of an exponential function is its constant growth (decay) factor.

**Requisite Course Objectives**

MATH 040-Comprehend that the key characteristic of an exponential function is its constant growth (decay) factor.

MATH 045-Comprehend that the key characteristic of an exponential function is its constant growth (or decay) factor and relate this to the differences between linear and exponential change with applications involving simple and compound interest.

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**Entrance Skills**

Demonstrate an understanding of the definition of a function including function notation and terminology (domain and range).

**Requisite Course Objectives**

MATH 040-Apply the definition of a function including function notation and terminology (domain and range).

MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.

MATH 049-Apply the definition of a function including function notation and terminology (domain and range), especially as function notation relates to a graph. Develop the ability to read a graph and precisely describe how the output variable changes wrt (with respect to) the output variable, using function notation and inequality notation.

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**Entrance Skills**

Apply mathematical principles and skills to novel situations.

**Requisite Course Objectives**

ENG 061-Demonstrate both literal and analytic/interpretive reading skills, and convey these skills in writing.

MATH 045-Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.

MATH 049-Read and comprehend an application problem, define variables appropriately and create a mathematical model that can be used to analyze the problem.

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**Entrance Skills**

Use mathematical language to communicate ideas, especially in writing.

**Requisite Course Objectives**

ENG 061-Demonstrate, in writing, the integration of purpose, audience, and tone, to achieve particular rhetorical goals.

ENG 061-Demonstrate both literal and analytic/interpretive reading skills, and convey these skills in writing.

MATH 045-Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.

MATH 049-Read and comprehend an application problem, define variables appropriately and create a mathematical model that can be used to analyze the problem.

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**Course Content**

1. Linear equations and functions.
2. Exponential and logarithmic functions and their applications.
3. Applications of linear functions to economics such as cost, revenue, and profit functions, supply and demand equations, break-even point, and free market equilibrium.
4. Systems of linear equations.
5. Matrices including matrix algebra, Gauss-Jordan elimination and reduced row echelon form.
6. Linear programming.
7. Mathematics of finance including simple and compound interest, present and future value, annuities, sinking funds, and amortization.
8. Set theory including DeMorgan's Laws and Venn Diagrams.
- 9 Probability and combinatorics including permutations and combinations, finding the probability of an event given the probabilities of the simple events in a sample space, conditional probability.

**Course Objectives**

Objectives	
Objective 1	Apply linear and exponential graphs and functions.
Objective 2	Write a system of linear equations to solve applied problems.
Objective 3	Solve a system of linear equations using Gauss-Jordan eliminations and interpret the result.
Objective 4	Find the inverse of a square matrix and use the inverse to solve a system of linear equations.
Objective 5	Solve linear programming problems in at least three variables.
Objective 6	Find unions, intersections, and complements of sets and use Venn diagrams to solve problems.
Objective 7	Apply basic combinatorial principles to enumeration problems.
Objective 8	Determine the probability of a specified event.
Objective 9	Find the conditional probability of an event.
Objective 10	Solve applied problems in finance including simple and compound interest, future and present value, annuities, sinking funds, and amortization.

**Student Learning Outcomes**

Upon satisfactory completion of this course, students will be able to:	
Outcome 1	Solve applied problems in finance involving interest and annuities.
Outcome 2	Apply matrix algebra to solve problems involving multiple unknown variables.
Outcome 3	Apply logic, probability, and counting methods to solve application problems.

**Methods of Instruction**

Method	Please provide a description or examples of how each instructional method will be used in this course.
Lecture	Lecture will be used for introduction and explanation of course topics.
Demonstration, Repetition/Practice	Problem solving exercises to be completed individually and in groups.
Discussion	Discussions among students and the instructor involving course content and applications.

**Methods of Evaluation**

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Mid-term and final evaluations	Students will be evaluated by a comprehensive two-hour final exam.	In Class Only
Tests/Quizzes/Examinations	Students will be evaluated using quizzes and examinations consisting of problems requiring application of studied principles and skills to new situations in addition to problems that parallel those solved in class and in homework.	In Class Only
Written homework	Students will be evaluated using homework amounting to at least six hours of work per week.	Out of Class Only

**Assignments**
**Other In-class Assignments**

- Attend classroom lectures and take notes.
- Participate in classroom discussions to review and evaluate various methods of solution used in homework.
- Participate in instructor-led problem solving.
- Complete examinations involving both familiar and novel problems.

**Other Out-of-class Assignments**

- Read textbooks and supplementary assignments.
- Complete assigned homework including problem solving exercises to improve skills and mathematical understanding.

**Grade Methods**

Letter Grade Only

**Distance Education Checklist****Instructional Materials and Resources**

**If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?**

We will be using either Pearson's MyMathLab or XYZ Homework/Lumen Learning's MyOpenMath, and these publishers will handle student data security.

**If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.**

With both MyMathLab and MyOpenMath, students will have access to an interactive mathematics assessment system for practicing course content, and to the textbook in the form of an etext. Students will access instructor-created or curated YouTube videos to supplement course content, and apply calculation and visualization tools such as Excel and Desmos.

**Effective Student/Faculty Contact**

**Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?**

**Within Course Management System:**

Discussion forums with substantive instructor participation  
Online quizzes and examinations  
Private messages  
Regular virtual office hours  
Timely feedback and return of student work as specified in the syllabus  
Weekly announcements

**External to Course Management System:**

Direct e-mail  
Posted audio/video (including YouTube, 3cm mediasolutions, etc.)  
Telephone contact/voicemail

**Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.**

Students will regularly and frequently complete assignments in discussion forums and/or groups, and submit written solutions to problem sets and will receive regular and frequent feedback from the instructor on these assignments.

**If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.**

Students will be able to contact their instructor on the phone or through email which will give them more opportunities for feedback and assistance with the course content.

**Other Information****Comparable Transfer Course Information****University System**

CSU

**Campus**

CSU Dominguez Hills

**Course Number**

MAT 105

**Course Title**

Finite Mathematics

**Catalog Year**

2019-2020

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**University System**

CSU

**Campus**

CSU Bakersfield

**Course Number**

Math 1300

**Course Title**

Finite Mathematics

**Catalog Year**

2018-2020

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**University System**

UC

**Campus**

UC Los Angeles

**Course Number**

Math 2

**Course Title**

Finite Mathematics

**Catalog Year**

2019-2020

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**COD GE**

C4.B - Language and Rationality - Communication and Analytical Thinking

**MIS Course Data****CIP Code**

27.0101 - Mathematics, General.

**TOP Code**

170100 - Mathematics, General

**SAM Code**

E - Non-Occupational

**Basic Skills Status**

Not Basic Skills

**Prior College Level**

Not applicable

**Cooperative Work Experience**

Not a Coop Course

**Course Classification Status**

Credit Course

**Approved Special Class**

Not special class

**Noncredit Category**

Not Applicable, Credit Course

**Funding Agency Category**

Not Applicable

**Program Status**

Program Applicable

**Transfer Status**

Transferable to CSU only

**General Education Status**

B = Mathematics/Quantitative Reasoning/Analytical Thinking

**Support Course Status**

N = Course is not a support course

**C-ID**

MATH 130

**Allow Audit**

Yes

**Repeatability**

No

**Materials Fee**

No

**Additional Fees?**

No

**Files Uploaded**

Attach relevant documents (example: Advisory Committee or Department Minutes)

Math 016\_COD GE Worksheet.pdf

**Approvals****Curriculum Committee Approval Date**

04/15/2021

**Academic Senate Approval Date**

04/22/2021

**Board of Trustees Approval Date**

05/21/2021

**Chancellor's Office Approval Date**

06/23/2021

**Course Control Number**

CCC000625643