

MATH 1029: Contemporary Mathematics (CMAT 1103)

Course Description:

This course covers mathematical approaches to practical life problems. Topics include counting techniques and probability, statistics, graph theory, and linear programming. [High school course code: 160347 Advanced Math – Functions & Statistics]

Course/Unit Credit:

3 credit hours; 1 Carnegie Unit

High School Course Code:

When used in the spring semester with Advanced Math – Functions and Statistics in the fall semester, this course can use 160347 for the high school course code for both semesters.

Grade(s):

11th or 12th grade

Primary Online Content Source:

Thinking Mathematically, 8e, MyMathLab, Robert Blitzer

Chapters for LSU MATH 1029: Contemporary Mathematics

7 — Algebra: Graphs, Functions, and Linear Systems

11 — Counting Methods and Probability Theory

12 — Statistics

14 — Graph Theory

Section Names (Number of Exercises) and Learning Objectives

Chapter 7: Algebra: Graphs, Functions, and Linear Systems

7.1 Introduction to the Rectangular Coordinate System (19)

- . Plot points in the rectangular coordinate system
- . Graph equations in the rectangular coordinate system

7.2 Graphing Linear Equations (17)

- . Use intercepts to graph a linear equation
- . Graph horizontal lines
- . Graph vertical lines

7.3 Solving Systems for Linear Equations (32)

- . Determine whether an ordered pair is a solution of a linear system
- . Solve linear systems by graphing
- . Solve linear systems by the substitution method
- . Solve linear systems by the addition method

7.4 Graphing Systems of Linear Inequalities (24)

- . Graph a linear inequality in two variables

- . Graph a system of linear inequalities

7.5 Linear Programming (16)

- . Use graphs to determine the maximum and minimum of an objective function
- . Use linear programming to solve application problems

Chapter 11: Counting Methods and Probability Theory

11.1 The Fundamental Counting Principle (27)

- . Use the Fundamental Counting Principle to find the number of possible outcomes
- . Understand the concepts involving the Fundamental Counting Principle

11.2 Permutations (35)

- . Use the Fundamental Counting Principle to count permutations
- . Evaluate factorial expressions
- . Use the permutations formula
- . Find the number of permutations of duplicate items
- . Understand concepts involving permutations

11.3 Combinations (27)

- . Distinguish between permutation and combination problems
- . Use the combinations or permutations formula to evaluate expressions
- . Solve problems involving combinations
- . Use combinations, permutations, or the Fundamental Counting Principle to solve problems
- . Understand concepts involving fundamentals of probability

11.4 Fundamentals of Probability (46)

- . Compute theoretical probability
- . Compute empirical probability
- . Understand concepts involving fundamentals of probability

11.5 Probability with the Fundamental Counting Principle, Permutations, and Combinations (23)

- . Compute probabilities with permutations
- . Compute probabilities with combinations
- . Understand concepts involving probability

11.6 Events Involving Not and Or; Odds (50)

- . Find the probability that an event will not occur
- . Find the probability of one event and a second event occurring
- . Solve conceptual problems involving probability
- . Understand and use odds

11.7 Events Involving And; Conditional Probability (44)

- . Find the probability of one event and a second event occurring
- . Compute conditional probabilities
- . Understand concepts involving conditional probability

11.8 Expected Value (12)

- . Compute the expected value
- . Use expected value to solve applied problems
- . Use expected value to determine the average payoff or loss in a game of chance

Chapter 12: Statistics

12.1 Collecting Data and Organizing Data (33)

- . Select an appropriate sampling technique
- . Understand and interpret data
- . Organize and present data
- . Apply estimation techniques to information given by graphs
- . Identify deceptions in visual displays of data
- . Understand concepts involving sampling, frequency distributions, and graphs

12.2 Measures of Central Tendency (45)

- . Determine the mean for the data set
- . Determine the median for the data set
- . Determine the mode for the data set
- . Determine the midrange for the data set
- . Interpret graphs, tables, and stem-and-leaf plots to be able to find the mean, median, mode, and midrange
- . Understand the concepts involving the measures of central tendency

12.3 Measure of Dispersion (32)

- . Determine the range for a data set
- . Find the mean, deviation from the mean, and sum of deviations
- . Determine the standard deviation for a data set
- . Understand concepts involving mean, range, and standard deviation

12.4 The Normal Distribution (44)

- . Find scores at a specified standard deviation from the mean
- . Use the 68–95–99.7 Rule
- . Convert a data item to a z-score
- . Solve applied problems involving normal distributions
- . Understand concepts involving the normal distributions

12.5 Percentiles and z-Scores (19)

- . Understand percentiles and quartiles
- . Solve applied problems involving normal distribution

Chapter 14: Graph Theory

14.1 Graphs, Paths, and Circuits (43)

- . Understand relationships in a graph
- . Model relationships using graphs
- . Understand and use the vocabulary of graph theory
- . Understand concepts involving graph theory

14.2 Euler Paths and Euler Circuits (38)

- . Understand the definitions of Euler path and Euler circuit
- . Use Euler's Theorem
- . Use Fleury's Algorithm to find the possible Euler paths and Euler circuits
- . Solve problems using Euler's Theorem and Fleury's Algorithm
- . Understand concepts involving Euler paths and Euler circuits

14.3 Hamilton Paths and Hamilton Circuits (33)

- . Understand the definitions of Hamilton paths and Hamilton circuits

- . Find the number of Hamilton circuits in a complete graph
- . Understand and use weighted graphs
- . Use the Brute Force Method to solve traveling salesperson problems
- . Use the Nearest Neighbor Method to approximate solutions to traveling salesperson problems
- . Understand concepts involving Hamilton paths and Hamilton circuits

14.4 Trees (31)

- . Understand the definition and properties of a tree
- . Find the spanning tree for a connected graph
- . Find the minimum spanning tree for a weighted graph
- . Solve applications using properties of a tree