



GOSHEN COLLEGE
MATHEMATICS DEPARTMENT
MATH 141 FINITE MATHEMATICS - SPRING 2012

Motivation	Quantitative information and reasoning are useful in making business decisions and understanding social phenomena. Effective use of quantitative information and reasoning is developed by this course.
Learning Goals	By the end of the course, students will do the following: <ol style="list-style-type: none">1. Model verbally described scenarios as mathematical problems, solve those mathematical problems, and interpret the solutions in the original scenario.2. Solve linear equations, inequalities, systems, and programs.3. Fit linear equation models to data.4. Calculate quantities associated with simple financial instruments.5. Calculate probabilities and statistics.6. Recognize when and how to use hand techniques and computer software to solve, fit, and calculate.7. Use and interpret graphs, matrices, Venn and tree diagrams, histograms, and other similar visualizations.
Instructor	David Housman, SC 117, dhousman@goshen.edu, 535-7405 (office), 875-0339 (home) Office hours posted on office door and at http://people.goshen.edu/~dhousman/Schedule12Spring.htm
Class Time	MWF 8:00-8:50 a.m. in NC 17.
Textbook	S. T. Tan, <i>Finite Mathematics for the Managerial, Life, and Social Sciences</i> , 10th edition, Brooks/Cole, 2012. This book is available both in print and electronically; either is acceptable. You must obtain a WebAssign account, which may be obtained separately or bundled with the book.
On-line	M:\Classes\MATH141\ for class notes. https://moodle.goshen.edu for grades and some resources. https://webassign.net/login.html for homework and other resources. The first time you visit this site, you should <ol style="list-style-type: none">1. Click on the <u>I Have a Class Key</u> link.2. Enter the Class Key: goshen 3659 6010.3. Follow the directions to either use an existing or create a new WebAssign account. You can do this before purchasing access to WebAssign; however, eventually you will need to pay on-line or enter a code obtained when purchasing the bundled text.
Tools	Excel is available on all campus computers. You should have a calculator with keys for exponentiation (often denoted by $^$ or x^y) and logarithm (often denoted by log or ln).
Prerequisites	One of (1) Math 120 Intermediate Algebra; (2) As and Bs in 2 years of high school algebra and 1 year of high school geometry, and a score of at least 500 on the SAT Math or at least 21 on the ACT Math; <u>or</u> (3) permission of instructor.
Grading	Grades will depend upon your performance on assignments (20%), four midterm exams (15% each), and a final exam (20%). If beneficial, your final exam grade will replace your grade on assignments or one of the midterm exams. Semester averages will be translated into letter grades in the following manner: 93% to A, 90% to A-, 87% to B+, 83% to B, 80% to B-, 77% to C+, 73% to C, 70% to C-, 67% to D+, 60% to D, and lower to F. Some upward adjustment may be made based upon class participation and individual effort and progress.
Assignments	Exercises will be assigned during almost every class and will be due before the start of the next class. They should help you synthesize and apply the concepts and techniques introduced in class and the

text. Late submission is permitted with a 30% penalty.

Extra Credit

Receive extra credit points applied to your assignment grade by doing one or more of the following activities: Attend a talk or participate in an activity that has some mathematics content and submit a paragraph or two description of what you thought was most interesting about the mathematics.

Exams

There will be four exams during the semester that will focus on the most recently covered material and one comprehensive final exam. Exams can only be made up if (1) there is a serious medical problem, a death in the immediate family, or an irreconcilable conflict with another official Goshen College activity; (2) there is written documentation signed by proper authorities; and (3) the instructor is notified prior to the exam or as soon as possible afterwards.

Academic Resource & Writing Center and Disabilities

Goshen College wants to help all students be as academically successful as possible. If you have a disability and require accommodations, please contact Lois Martin, the Director of the Academic Resource & Writing Center early in the semester. In order to receive accommodations, documentation concerning your disability must be on file with the Academic Resource & Writing Center, Good Library 113, x7576, lmartin@goshen.edu. All information will be held in the strictest confidence. The Academic Resource & Writing Center offers tutoring and writing assistance for all students. For further information please see <http://www.goshen.edu/studentlife/arwc>.

Collaboration and Academic Integrity

You are encouraged to use all available resources in order to learn the concepts and techniques discussed in this course. In particular, conversations with other students and the instructor can be an effective learning method. Reading other books and web pages can be another effective learning method. However, copying someone else's work subverts the learning process.

For assignments, you may look at and discuss another student's work, but any written work developed during collaboration with another student should be destroyed before writing your own solutions. You should give written acknowledgement to people with whom you have had discussions and to any written materials (other than the text) that were helpful.

For exams, you may *not* use any resources unless a specific exception is stated by the instructor.

Failure to observe the above rules will result in a penalty ranging from a zero on the assignment or exam to immediate failure of the course. Any violation of academic integrity will be reported to the Academic Dean.

Observation of the above rules will help you learn the material well and give you the satisfaction of knowing that you have earned your grade.

Tentative Schedule

Exam 1 Monday, January 30 covering linear equations (chapters 1 & 2).
Exam 2 Monday, February 20 covering linear programming & finance (chapters 3 & 5).
Exam 3 Monday, March 19 covering sets, counting, & probability (chapters 6 & 7).
Exam 4 Friday, April 13 covering probability & statistics (chapters 7 & 8).
Final Exam Tuesday, April 17, 8:00 – 10:00 a.m. covering the entire course.

Advice

Expect to devote at least six hours per week of study outside of class.

Read the text in an anticipatory fashion: for each example, cover up the author's solution and attempt the problem yourself and then uncover what you did not understand by comparing the author's solution with your own.

Strive for perfect assignments: there is sufficient time and assistance available for every student to obtain nearly 100% on every assignment

Work extra problems. The odd numbered exercises have answers available for you to check your solutions.

Collaborate with peers. Explain your solutions to others and listen to their explanations.

Seek assistance when confused. The instructor, the Academic Resource and Writing Center, and your peers are available.

**Exam 1
Learning
Objectives**

1. Plot points and determine the coordinates of a point on a coordinate system graph.
2. Find the distance between two points.
3. Find the areas of rectangles and triangles.
4. Understand why the distance formula is correct.
5. Find the equation of a line from a graph of the line, two points on the line, one point on the line and its slope, or a verbal description.
6. Graph a line from an equation.
7. Find equations of perpendicular and parallel lines.
8. Interpret verbally an equation of a line.
9. Draw a straight line that captures the trend of approximately linear data, find the equation of that line, and interpret the equation.
10. Determine the intersection of two lines graphically and algebraically.
11. Formulate a system of linear equations to solve a problem described verbally.
12. Use technology to determine a line that minimizes the maximum, average, or root mean square error with respect to data.
13. Solve a system of equations.
14. Use technology to solve a system of equations.
15. Use tables and matrices to organize information.
16. Determine when it is appropriate to use matrix addition and multiplication.
17. Determine matrix sums and products.

**Exam 2
Learning
Objectives**

1. Solve a system of linear inequalities graphically.
2. Formulate a linear program to solve a problem described verbally.
3. Solve a linear program and perform a sensitivity analysis graphically.
4. Use technology to solve a linear program and perform a sensitivity analysis.
5. Interpret the solution and sensitivity analysis of a linear program.
6. Determine the accumulated values, present values, effective yields, and holding times of single deposits in regularly compounded and simple interest accounts.
7. Determine the future value, present value, and deposit amount of a simple annuity.
8. Use technology to evaluate financial formulas.
9. Formulate an appropriate financial calculation for a problem described verbally.
Plot points and determine the coordinates of a point on a coordinate system graph.

**Exam 3
Learning
Objectives**

1. Describe sets with words, roster notation, and builder notation.
2. Translate among verbal, roster notation, and builder notation descriptions of sets.
3. Determine whether something is an element of a set.
4. Determine whether a set is a subset of another set.
5. Find the complement of a set, and find the intersection and union of two sets.
6. Understand and use standard set theory notation.
7. Use sum rules and Venn diagrams to find the number of elements in a set.
8. Use multiplication rules and tree diagrams to find the number of elements in a set.

9. Use combinations and permutations to find the number of elements in a set.
10. Identify experiments, sample points, sample spaces, and events.
11. Understand and use standard probability notation.
12. Understand the empiricist's, subjectivist's, and theoretician's views of probability.
13. Find probabilities of events associated with person/card/ball/item drawing and dice rolling experiments.
14. Find probabilities using the sum and complement rules.
15. Find probabilities using counting rules.
16. Find probabilities using simulation.

**Exam 4
Learning
Objectives**

1. Understand the high probability of coincidences.
2. Find conditional probabilities.
3. Determine whether two events are independent.
4. Understand that even highly accurate tests can lead to many false positives.
5. Determine the probability distribution of a random variable and draw its histogram.
6. Determine the mean, variance, and standard deviation of a random variable.
7. Determine the mean, median, and mode of a list of numbers.
8. Estimate the median, mean, and standard deviation of a random variable from a histogram of its probability distribution.
9. Translate among probability, odds in favor, and odds against an event.
10. Determine when an experiment is a binomial experiment and calculate associated probabilities, means, and standard deviations.
11. Determine when a random variable is likely to have a normal distribution.
12. Estimate normal distribution probabilities.
13. Use technology or a table to evaluate normal distribution probabilities.
14. Find probabilities and confidence intervals using simulation.