

Catalog Description: *Math 141: Business Mathematics I* (Credit 3) Linear and quadratic equations and applications; functions and graphs, systems of linear equations, matrix algebra and applications, linear programming, probability and applications, statistics. *Prerequisites:* High school algebra I and II and geometry. Credit will not be given for more than one of MATH 141 and 166.

### **Learning Outcomes**

This course is focused on quantitative literacy in mathematics found in both business and everyday life. Upon successful completion of this course, students will be able to:

- Logically find relationships among variables to formulate mathematical models for everyday applications, including business applications, such as cost, revenue, profit, supply and demand.
- Understand matrices and their applications, including solving systems of linear equations.
- Construct linear programming problems for various applications and solve using graphical techniques, including finding the optimal point(s) where a company minimizes its cost or maximizes its profit.
- Understand set terminology and its relationship to symbolic notation.
- Use Venn diagrams to model the relationship between sets and set operations, with applications to real-world problems.
- Understand the principles of probability and counting and apply these concepts to a variety of problems, such as finding the number of ways or probability of obtaining particular card hands.
- Identify types of random variables and calculate probabilities and statistics for random variables.
- Apply the concepts of finance to real-world situations, such as financing a car or house.

### **Core Objectives**

#### *Critical Thinking*

- Students will carefully examine and interpret statements to determine equivalent mathematical notation and/or equations.
- Students will think creatively in order to set up a system of equations and solve a word problem.
- Students will analyze given information to set up a linear programming problem, including a system of linear inequalities.
- Students will use inquiry to determine if a solution exists to a linear programming problem.
- Students will examine given information about sets to find the number of elements in particular subsets.
- Students will innovatively use counting techniques (multiplication principle, combinations, permutations) to determine the number of ways a task can be completed and to find the probability the task occurs.
- Students will synthesize information to determine whether or not events are independent.
- Students will differentiate between basic and conditional probability, including knowing when Bayes' Theorem is appropriate.
- Students will evaluate probabilities involving Venn diagrams, tree diagrams, and independent events.
- Students will classify random variables as finite discrete, infinite discrete, or continuous and find all possible values they may assume.
- Students will understand the difference between odds and the probability of an event, and be able to determine one given the other.
- Students will use inquiry to resolve whether or not an experiment is binomial.
- Students will calculate probabilities of binomial and normal random variables.
- Students will understand the difference between simple and compound interest and when to use each.

#### *Communication Skills*

- Students will express mathematical concepts both abstractly with equations and in writing.
- Students will exhibit functions, as well as solutions to linear inequalities, graphically.
- Students will explain why a matrix operation is possible or not, and interpret the meaning of the entries of the resulting matrix when the operation makes sense.
- Students will solve linear programming problems graphically.
- Students will effectively communicate information about sets and experiments using written symbolic notation.
- Students will visually represent sets with Venn diagrams.
- Students will visually display experiments and associated probabilities using tree diagrams.
- Students will communicate statistics through probability distributions and graphically through histograms.
- Students will answer questions during lecture concerning topics discussed in class.

#### *Empirical and Quantitative Skills*

- Students will develop business-related mathematical models from given data, such as cost, revenue, profit, supply, demand, or depreciation.
- Students will create empirical probability distributions based on a given set of data.
- Students will describe numerical data by finding relevant statistics, including expected value, median, mode, standard deviation, and variance.
- Students will use statistics to make informed conclusions about real-world problems, such as determining the premium for an insurance policy.
- Students will use effective interest rates to select the best loan or savings option.
- Students will analyze financial information to make decisions regarding everyday applications, such as loan payments, annuities, amortizations, or sinking funds.

**Instructor:** Dr. Janice Epstein, Blocker 245D, 845-3261

**Email:** [j-epstein@tamu.edu](mailto:j-epstein@tamu.edu). Include your full name and class/section number in any email.

**Webpage:** [www.math.tamu.edu/~epstein/MATH141HYBRID](http://www.math.tamu.edu/~epstein/MATH141HYBRID)

**Office Hours:** Wednesdays and Thursdays 1:00 – 2:30 pm in BLOC 246. Also by appointment.

**Tutoring Hours:** There will be drop-in free tutoring with Nathaniel Butler in BLOC 111.

- Mondays and Wednesdays 3:00 – 5:00 pm
- Tuesdays and Thursdays 6:00 – 8:00 pm

**Required Materials:**

- *Textbook: Finite Mathematics for the Managerial, Life, and Social Sciences, 11<sup>th</sup> Ed.* by Tan
  - You paid for an electronic book version of the text when you enrolled in this course. Information on how to access your ebook can be found under the “Student Information Page” at <http://www.math.tamu.edu/courses/eHomework/>. Look under the Math 141 link.
  - If you would like a hard bound or loose-leaf copy of the textbook you may buy one, but it is not required.
- *Calculator:* A TI-83, TI-84 (Regular, Plus or Silver edition) or the TI-Nspire (non-CAS version with an 84 faceplate) calculator is **REQUIRED** and you must bring your calculator to each class. If you want to use a calculator other than those listed, it may not perform symbolic mathematics and you must have my permission to do so. Calculators will be reset before every exam.
- *Texas A&M Student ID:* You must bring your student ID to class with you.
- An iClicker2 or access to iClicker GO
- Four blank “Aggie” scantrons (large grey ones).
- All written graded work must be in pencil or black ink.

**Grading:**

Quizzes	15%
Daily Grades (homework, videos, and class activities)	15%
Three In-Class Exams	15% each
Cumulative Final Exam	25%

*Required Averages:* A 90–100%      B 80–89%      C 70–79%      D 60–69%      F 0–59%

**Exam Schedule:**

Exam I	Sections 1.3-1.4, 1.Q, 2.1-2.5	Friday, February 13
Exam II	Sections 3.1-3.3, 6.1-6.4, 7.1	Friday, March 13
Exam III	Sections 7.2-7.6, 8.1-8.4	Friday, April 17
Final Exam	Cumulative	Thursday, May 7, 5:30 – 7:30 PM (room TBA)

**Attendance & Make-up Policy:** Attendance is required in this class. No make-up exams or late assignments are possible /accepted without a University-approved excused absence (see the Texas A&M University Student Rules). Remember that an absence for a non-acute medical service or regular check-up does not constitute an excused absence. To be excused, you must notify me in writing prior to the date of absence if possible. Consistent with Texas A&M Student Rules, in cases where advance notification is not feasible (e.g. accident, or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class. For injury or illness too severe or contagious to attend class, you must provide confirmation of a visit to a health care professional affirming date and time of visit. The Texas A&M University Explanatory Statement for Absence from Class form will not be accepted. It is the student's responsibility to schedule a make-up in a timely manner. See Student Rules <http://student-rules.tamu.edu/rule07>.

**Scheduled Make-Up Exams:** If you have a University approved absence for missing an exam, you will be expected to make up your exam according to the schedule at , <http://www.math.tamu.edu/courses/makeupscheduleSpring2015-2.pdf> starting with the earliest option for each exam.

The lowest two quizzes and activities will be dropped, so there are no make-ups for these assignments.

**Class Format:** This course will be taught using interactive online videos along with class meetings once per week. Videos will generally be due on Monday nights at 11:55 pm.

**Daily Grades:** The online homework will generally be due on Thursday evenings at 11:55 pm. Quizzes will typically occur once per week and will be given at the end of class. During class we will spend time working in groups on activities and your answers to the activities will be entered using your clickers.

### **Extra Help & Preparing for Exams**

*Office Hours and Tutoring:* Please attend office hours or tutoring for additional one-on-one help.

*Week-in-Review:* There will be two Week-in-Review sessions for all Math 141 students meeting weekly in which the topics of the previous week will be reviewed and additional examples will be provided. Time, location, and notes will be posted at

<http://www.math.tamu.edu/~scarboro/141spring2015wir.html> and <http://www.math.tamu.edu/~epstein/MATH141WIR/>

*Practice:* In addition to the Week-in-Review problems, I strongly recommend that you practice extra problems on your own from the book. See the suggested homework list on my webpage.

*Help Sessions:* Help sessions are an opportunity for you to ask questions and get help with your homework. Students who have previously taken Math 141 lead the help sessions. The schedule is at

<http://www.math.tamu.edu/teaching/helpsession/helpsessions.html>

### **Copyright:**

All exams, printed handouts and/or assignments, and web-materials are protected by U.S. Copyright Laws. No multiple copies can be made without my written permission. No exams or assignments may be shared with anyone outside of the class.

**Academic Integrity Statement:** "An Aggie does not lie, cheat, or steal or tolerate those who do."

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information please visit: <http://aggiehonor.tamu.edu>

### **Disabilities:**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit

<http://disability.tamu.edu>

**Tentative Schedule:** All changes will be announced on the web or via e-mail.

Week			
1	1/19 – 1/23	Introduction, Sections 1.3, 1.4	Linear Models for Business Applications Intersection of Lines
2	1/26 – 1/30	Sections 1.Q, 2.1, 2.2	Quadratic Functions and Applications Formulating Systems of Linear Equations Gauss-Jordan Elimination Solving Systems of Linear Equations
3	2/2 – 2/6	Sections 2.3, 2.4, 2.5	Solving Systems of Linear Equations Arithmetic Operations with Matrices Matrix Multiplication
4	2/9 – 2/13	Review, <b>Exam I (1.3-1.4, 1.Q, 2.1-2.5)</b>	
5	2/16 – 2/20	Sections 3.1, 3.2, 3.3	Graphing Systems of Linear Inequalities Formulating Linear Programming Problems Graphical Solution of Linear Programming Problems (Method of Corners, Leftovers)
6	2/23 – 2/17	Sections 6.1, 6.2, 6.3	Sets and Set Operations Venn Diagrams The Multiplication Principle
7	3/2 – 3/6	Sections 6.3, 6.4, 7.1	The Multiplication Principle Permutations and Combinations Experiments, Sample Spaces, & Events
8	3/9 – 3/13	Review <b>Exam II (3.1-3.3, 6.1-6.4, 7.1)</b>	
	3/16 – 3/20	SPRING BREAK	
9	3/23 – 3/27	Sections 7.2, 7.3, 7.4	Basic Probability Rules of Probability Use of Counting Techniques in Probability
10	3/30 – 4/3	Sections 7.5, 7.6	Conditional Probability & Tree Diagrams Independent Events Bayes' Theorem
11	4/6 – 4/10	Sections 8.1, 8.2, 8.3, 8.4	Classification of Random Variables Probability Distributions of Random Variables Expected Value, Statistics, & Odds Variance and Standard Deviation The Binomial Distribution
12	4/13 – 4/17	Review <b>Exam III (7.2-7.6, 8.1-8.4)</b>	
13	4/20 – 4/24	Sections 8.5, 8.6, 5.1	The Normal Distribution Simple & Compound Interest Effective Rates of Interest
14	4/27 – 5/1	Sections 5.1, 5.2, 5.3	Annuities Amortization and Sinking Funds
15	5/4 – 5/9	Review (5/5) Final (5/7 at 5:30)	<b><u>Tuesday is redefined as Friday, so we have class on May 5</u></b>