MATH 1324 - Mathematics for Business & Social Sciences 401 Course Syllabus

Description
The application of common algebraic functions, including polynomial, exponential, logarithmic, and rational, to problems in business, economics, and the socials sciences are addressed. The applications include mathematics of finance, including simple and compound interest and annuities; systems of linear equations; matrices; linear programming; and probability, including expected value.

Semester Offered
Fall Face to Face
Spring Online
Summer 1 Online
Credits 3
Lecture Hours 3
Lab Hours 0
Extended Hours 0
Contact Hours 48
State Approval Code 27.0301.52 19
Instructor Name Emily Zabcik
Semester/Year Summer I 2025

Meeting Time and Location
Online—students are expected to spend at least 12-16 hours per week** reading, reviewing, and participating in assigned activities for successful completion of this course.

Alternate Operations During Campus Closure

In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Panola College to move to altered operations. During this time, Panola College may opt to continue delivery of instruction through methods that include, but are not limited to: online learning management system (CANVAS), online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor Panola College's website (www.panola.edu) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

Student Basic Needs

Unexpected circumstances may arise, but Panola College offers various resources to support students. If you need mental health services or are facing challenges with transportation, affording class materials and supplies, or accessing food regularly—issues that may impact your class performance—please visit panola.edu/resources.

Class Attendance

Regular and punctual attendance of classes and laboratories is required of all students. When a student has been ill or absent from class for approved extracurricular activities, he or she should be allowed, as far as possible, to make up for the missed work. If a student has not actively participated by the census date, they will be dropped by the instructor for non-attendance. This policy applies to courses that are in-person, online, hybrid, and hyflex.

Attendance in online courses is determined by submission of an assignment or participation in an activity. According to federal guidelines, simply logging into a distance learning course without participating in an academic assignment does not constitute attendance. Distance learning is defined as when a majority (more than 50%) of instruction occurs when the instructor and students are in separate physical locations. Students must engage in an academic activity prior to the course census date.

When an instructor feels that a student has been absent to such a degree as to invalidate the learning experience, the instructor may recommend to the Vice President of Instruction that the student be withdrawn from the course. Instructors may seek to withdraw students for non-attendance after they have accumulated the following number of absences:

Fall or spring semesters:

3 or more class meeting times per week - 5 absences

2 class meeting times per week - 3 absences

1 class meeting per week - 2 absences

The student is responsible for seeing that he or she has been officially withdrawn from a class. A student who stops attendance in a class without officially withdrawing from that class will be given a failing grade; consequently, the student must follow official withdrawal procedures in the Admissions/Records Office.

Please note: Health Science and Cosmetology courses may require more stringent attendance policies based on their accreditation agencies. Please see the addendum and/or program handbook for further information concerning attendance.

Pregnant/Parenting Policy

Panola College welcomes pregnant and parenting students as a part of the student body. This institution is committed to providing support and adaptations for a successful educational experience for pregnant and parenting students. Students experiencing a need for accommodations related to pregnancy or parenting will find a Pregnancy and Parenting Accommodations Request form in the Student Handbook or may request the form from the course instructor.

Artificial Intelligence (AI) Course Policy

There are situations throughout the course where you may be permitted to use artificial intelligence (AI) tools to aide in further understanding of mathematical concepts. However, AI tools may not be used for any graded assignments including but not limited to exams, quizzes, and projects. Use of any AI-generated content in this course without the instructor's consent qualifies as academic dishonesty and violates Panola College's standards of academic integrity.

Instructional Goals and Purposes

The purpose of this course is to demonstrate:

1. Competence in solving m x n linear systems and in solving problems leading to an m x n system.
2. Competence in solving a linear programming problem given an objective function and a system of constraints.
3. Competence in formulating the objective function and a system of constraints necessary to solve a stated problem.
4. Competence in graphing functions which are not linear, in the algebra and composition of functions have and their application to problem solving.
5. Competence in solving problems involving compound interest, compound discount, ordinary simple annuities, and debt extinction by amortization and sinking funds.
6. Competence in solving problems involving permutations, combinations, and probability.

Learning Outcomes

After studying all materials and resources presented in the course, the student will be able to:

1. Apply elementary functions, including linear, quadratic, polynomial, rational, logarithmic, and exponential functions to solving real-world problems.
2. Solve mathematics of finance problems, including the computation of interest, annuities, and amortization of loans.

3. Apply basic matrix operations, including linear programming methods, to solve application problems.
4. Demonstrate fundamental probability techniques and application of those techniques, including expected value, to solve problems.
5. Apply matrix skills and probability analyses to model applications to solve real-world problems.

Course Content

A general description of lecture/discussion topics included in this course are listed in the Learning Objectives / Specific Course Objectives sections of this syllabus.

Students in all sections of this course will learn the following content:

1. Give an example of and/or use in an applied situation the following symbols and terms a. set builder (set specification) notation b. null or empty set c. element d. universal set e. subset f. proper subset g. equality of sets h. total number of possible subsets (and proper and nonempty) of a given set
2. Define the following terms: a. relation b. domain c. range d. function
3. Apply (identify) the above terms in applied problems.
4. Sketch the graph of a relation and determine by using the function vertical line test if it is the graph of a function.
5. Determine the domain and range of a relation that is specified via a graph.
6. Determine the slope of a line given two ordered pairs.
7. Determine the slope of any given horizontal line.
8. Identify the slope of any given vertical line as undefined.
9. Given two sets of ordered pairs, determine if the indicated line segments are parallel, perpendicular have or neither.
10. Graph an equation of the form y = c or x = c, where c is a constant.
11. Graph an equation of the form y = mx + b.
12. Write the equation of a line when given a point and the slope.
13. Write the equation of a line when given a point and the equation of a line parallel or perpendicular to the desired line.
14. Write the equation of a line when given two points on that line.
15. Write the equation of a line when given the x- and y-intercepts of that line.
16. Write a linear cost function when given the variable cost and the fixed costs.
17. Write a cost function when given that (i) the function is linear and (ii) ordered pairs (q,p)
18. Solve a system of equations using the addition/elimination method.
19. Translate word problems into systems of equations and solve.
20. Find the breakeven point when given a linear cost function and a linear revenue function.
21. Find the market equilibrium point given the supply equation and the demand equation.
22. Determine the dimensions of a given matrix.
23. Write a zero matrix, given the dimensions.
24. Determine the conformability of two matrices for addition.
25. Add or subtract two (or more) conformable matrices.
26. Determine the conformability of two matrices to regular matrix multiplication.
27. Multiply two conformable matrices.
28. Find the dot product of two vector matrices.
29. Show, by example, that matrix multiplication is not commutative.
30. Solve a system of linear equations using the Gauss-Jordan Elimination Method.
31. Solve a system of linear equations that is dependent.
32. Identify a system of linear equations as having "no solution."
33. Give a geometric interpretation to the solution(s) of a system of linear equations.
34. Find the inverse of a given nonsingular matrix and use it to solve a system of linear equations.
35. Graph systems of linear inequalities.
36. Determine the values of x and y that maximize or minimize some linear function f(x,y) subject to a set of constraints.
37. Solve applied linear programming problems.
38. Compute simple interest.
39. Write a specified number of terms of a sequence.
40. Find certain specified terms of an arithmetic sequence.
41. Find sums of a specified number of terms of a given arithmetic sequence.

42. Compute the compound (future) amount and compound interest of money invested where interest is compounded at regular intervals.
43. Compute the compound (future) amount and interest on money where interest is compounded continuously.
44. Compute the effective annual interest rate of money invested at compound interest.
45. Find certain specified terms of a geometric series.
46. Find the sum of a specified number of terms of a given geometric sequence.
47. Compute the amount (future value) of an ordinary annuity.
48. Compute the present value of an ordinary annuity.
49. Compute the regular payments required to amortize a debt.
50. Compute the amount that must be invested periodically in a sinking fund to discharge a debt or other financial obligation at some specified time in the future.
51. Apply the multiplication rule to find the number of ways an event can happen.
52. Determine the number of permutations of n things taken r at a time (both with and without repetition), nPr.
53. Determine the number of permutations of n given objects when p of the n objects are alike and of one kind, q of the objects are alike of a second kind, ..., up to t others alike of still another kind.
54. Determine the number of circular permutations of n distinct objects.
55. Determine the number of combinations of n distinct objects taken r at a time, nCr.
56. Define the following terms: (i) sample space (ii) sample point (iii) event (iv) compound event
57. Given an experiment, describe a suitable sample space.
58. Define & compute the probability of an event, E, occurring.
59. Define mutually exclusive events.
60. Define the probability of the complement of the event E.
61. Define random selection and use it in finding the probability of an event, E, occurring.
62. Determine the hyper-geometric probability of an event occurring.
63. Define conditional probability and find P(B|A
64. Find P(A and B) when P(A) and P(B|A) are available.
65. Find P(A or B).
66. Define independent events and apply this concept to finding probabilities in applied problems.

Methods of Instruction/Course Format/Delivery

Methods of Instruction/Course Format/Delivery: Methods employed will include online lecture and demonstration videos, discussion, problem solving, analysis, and reading assignments. Homework will be assigned. Faculty may choose from, but are not limited to, the following methods of instruction:

1. Lecture
2. Discussion
3. Internet
4. Video
5. Television
6. Demonstrations
7. Field trips
8. Collaboration
9. Readings

Major Assignments/Assessments

The following items are assigned and assessed during the semester and used to calculate the student's final grade.

Assignments

Assignments

Faculty may assign both in- and out-of-class activities to evaluate students' knowledge and abilities. Faculty may choose from, but are not limited to the following methods: attendance, class preparedness, and participation. Collaborative learning projects, exams/tests/quizzes, homework, internet, library assignments, readings, research papers, scientific observations, student-teacher conferences, and written assignments.

The Mathematics Department does not accept late work.

Assessments

Assessments

Assessment(s):

1. Major Exams
2. Comprehensive Final Exam

Course Grade

Assignment Weights

- Daily Grades 25%
- Major Exams 50%
- Comprehensive Final Exam 25%

Letter Grades for the Course will be assigned as follows:

A: 90 < Average < 100

B: 80 < Average < 90

C: 70 < Average < 80

D: 60 < Average < 70

F: 00 < Average < 60

Texts Materials, and Supplies

- Textbook: Business Precalculus by David Lippman by Lumen (No Purchase Necessary)
- Lumen OHM (No Purchase Necessary)
- Canvas Access

Addendum

See attached.

https://docs.google.com/document/d/1pGNaYCialvXBWNDsMeR9QAQWvHjbef-K/edit?usp=drive_link&ouid=109126534847065526530&rtpof=true&sd=true

Other

- Courses conducted via video conferencing may be recorded and shared for instructional purposes by the instructor.
- For current texts and materials, use the following link to access bookstore listings: https://www.panolacollegestore.com.
- For testing services, use the following link: https://www.panola.edu/student-services/studentsupport/academic-testing-center.
- The Accommodations & Disability Support (A&DS) Office at Panola College provides and facilitates support services and accommodations for students with disabilities. The A&DS office works under the federal guidelines included in Section 503 of the Rehabilitation Act of 1973 and the American with Disabilities Act. Please contact the Accommodations & Disability Support (A&DS) Office located in the Charles C. Matthews Student Center or go to https://www.panola.edu/disabilitysupport for more information.
- Withdrawing from a course is the student's responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
- Student Handbook: https://www.panola.edu/ (located on at the bottom under student)