Course Syllabus

Math 1325 – Mathematics for Business and Social Sciences II

Catalog Description: This course is the basic study of limits and continuity, differentiation, optimization and graphing,and integration of elementary functions, with emphasis on applications in business, economics, and social sciences.This course is not a substitute for MATH 2413,Calculus I. **Lecture hours** = 3, **Lab hours** = 0

Prerequisites: MATH 1324 or MATH 1314

Semester Credit Hours: 3
Lecture Hours per Week: 3
Lab Hours per Week: 0
Contact Hours per Semester: 48
State Approval Code: 27.0301.53 19

Class section meeting time:

Core Components and Related College Student Learning Outcomes
This course counts as part of the academic requirements of the Panola College Core Curriculum and an Associate of Arts or Associate of Science degree. ☒ Yes ☐No: If no, skip to Instructional Goals.

The items below marked with an X reflect the state-mandated outcomes for this course **IF this is a CORE course**:

☒ Critical Thinking Skills – to include creative thinking, innovation, inquiry and analysis, evaluation and syntheses of information
- ☐ CT1: Generate and communicate ideas by combining, changing, or reapplying existing information
- ☒ CT2: Gather and assess information relevant to a question
- ☒ CT3: Analyze, evaluate, and synthesize information

☒ Communication Skills – to include effective development, interpretation, and expression of ideas through written, oral, and visual communication
- ☒ CS1: Develop, interpret, and express ideas through written communication
- ☐ CS2: Develop, interpret, and express ideas through oral communication
- ☐ CS3: Develop, interpret, and express ideas through visual communication

☒ Empirical and Quantitative Skills – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions
- ☒ EQS1: Manipulate and analyze numerical data and arrive at an informed conclusion
- ☐ EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion

☐ Teamwork – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal
- ☐ TW1: Integrate different viewpoints as a member of a team
- ☐ TW2: Work with others to support and accomplish a shared goal

☐ Personal Responsibility – to include the ability to connect choices, actions, and consequences to ethical decision-making
- ☐ PR1: Evaluate choices and actions and relate consequences to decision-making

☐ Social Responsibility – to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities

- ☐ SR1: Demonstrate intercultural competence
- ☐ SR2: Identify civic responsibility
- ☐ SR3: Engage in regional, national, and global communities

Instructional Goals and Purposes:
Upon completion of MATH 1325, the student will be able to demonstrate:

1. Competence in finding limits for function, if they exist, at a point and approaching infinity and in applying these concepts to continuity and asymptotes.
2. Competence in finding derivatives for functions using the definition of the derivative.
3. Competence in applying the rules for finding derivatives of functions.
4. Competence in finding higher order derivatives.
5. Competence in using the first and second derivatives, asymptotes, x- and y-intercepts, points of inflection, extrema, and symmetry to graph functions.
6. Competence in finding first and second derivatives implicitly.
7. Competence in applying derivatives to optimization (applied max/min) problems.
8. Competence in finding the indefinite integral for a variety of functions.
9. Competence in finding the definite integral.
10. Competence in finding the areas under and between curves.
11. Competence in evaluating improper integrals.

Learning Outcomes:

1. To apply problem-solving skills through solving application problems.
2. To demonstrate arithmetic and algebraic manipulation skills.
3. To read and understand scientific and mathematical literature by utilizing proper vocabulary and methodology.
4. To construct appropriate mathematical models to solve applications - physical, symbolic, graphical, and verbal - to solve application problems
5. To interpret and apply mathematical concepts.
6. To use multiple approaches - physical, symbolic, graphical, and verbal - to solve application 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:

After studying the material presented in the text(s), lecture, laboratory, computer tutorials, and other resources, the student should be able to complete all behavioral/learning objectives listed below with a minimum competency of 70%.

Algebra Concepts and Functions

Upon completion of this section, the student will be able to correctly

1. Give an example of and/or use in an applied situation the following symbols and terms:

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, 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.

12. 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) (quantity, price).

18. Solve a system of equations using the addition/elimination method.

19. Translate word problems into systems of equations and solve.

20 .Find the break even 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 if a relation is a function.

23. State the domain and range of certain specified functions.

24. Use functional notation.

25.Graph linear functions.

26.Find slopes of parallel and perpendicular lines.

27.Write equations of lines given certain data.

28.Formulate, graph, and evaluate total cost, total revenue, and profit functions.

29.Find break-even points

30.Evaluate and graph supply and demand functions.

31.Find market equilibrium.

32.Determine if a vertex of a parabola is a maximum point or a minimum point.

33.Find the vertex of the graph of a quadratic function.

34.Find the zeros (x-intercepts) of a quadratic function.

35.Graph quadratic functions.

Derivatives

Upon completion of this section, the student will be able to correctly

1. Evaluate the limit of a given function at a point using the properties of limits.

2. Evaluate one-sided limits of a function at a point using the properties of limits.

3. State the definition of continuity at a point for a function.

4. Determine if a function is continuous in its domain by using the definition referenced above.

5. State the definition for slope of a tangent line to the graph of the function $y = f(x)$.

6. Find the slope of a tangent line to a point using the definition referenced above.

7. State the definition of the derivative of $y= f(x)$ at a point.

8. Find the equation of the tangent line to the graph of $y = f(x)$ at a given point.

9. Find the point(s), if any, at which the derivative is nonexistent.

10.List the different symbols for the derivative.

11.Find a derivative using the power rule.

12.Find a derivative using the "constant times a function" rule.

13.Find a derivative using the sum and/or difference rules.

14.Find a derivative using the Product Rule.

15.Find a derivative using the Quotient Rule.

16. Find a derivative using the Chain Rule.

17.Find the derivative of a function using implicit differentiation.

18.Find higher order derivatives.

19.Find the second derivative using implicit differentiation.

20.State the definition of the differentials dx and dy.

21.Approximate quantities using differentials.

Applications of Derivatives

Upon completion of this section, the student will be able to correctly

1. Find the derivative of a function using implicit differentiation.

2. Evaluate the derivative at a given point of and implicitly defined function and find the equation of the tangent line at the point.

3. Find limits at infinity.

4. Indicate if a function has an infinite limit at a point.

5. Indicate if a function possesses a vertical asymptote.

6. Indicate if a function possesses a horizontal asymptote.

7. Find on what intervals a function is increasing and on what intervals it is decreasing.

8. Find the critical values of a function.

9. Find and classify the local extrema of a function.

10.Discuss the concavity of a function.

11.Find the points of inflection of a function.

12.Use the Second Derivative Test to classify local extrema.

13.Analyze a function using the first and second derivatives to find

(i) intervals where the function is increasing/decreasing/constant,
(ii) intervals where the function is concave upward/downward, and

(iii)and classify all local extrema and points of inflection.

14.Find and classify the absolute (global) extrema of a function on an interval.

15.Solve selected applied optimization (max/min) problems.

Exponential and Logarithmic Functions

Upon completion of this section, the student will be able to correctly

1. Graph an exponential function.
2. Recognize the typical types of exponential graphs.
3. Graph functions involving the irrational number e.
4. Solve exponential equations.
5. Define a logarithmic function.
6. Change from a logarithmic to exponential form and vice versa.
7. State and apply the properties of logarithms.
8. Find the derivative of logarithmic functions.
9. Graph y = ln (x).
10. Find the derivative of exponential functions.
11. Graph y = ex and y = e-x.

Indefinite Integrals

Upon completion of this section, the student will be able to correctly

1. State the specified basic indefinite integral (anti-derivative) formulae.
2. State the properties of the indefinite integral.
3. Integral a function using the general power rule.

Definite Integrals

Upon completion of this section, the student will be able to correctly

1. Identify the integrand and the upper and lower limits of integration for a definite integral.
2. Evaluate the definite integral using the Fundamental Theorem of Integral Calculus.
3. Find the area under a curve, area between two curves, and signed areas, all using the definite integral.
4. Use the rectangular rule for approximating the definite integral.
5. State the definition of the definite integral.
6. State the Fundamental Theorem of Calculus.
7. Find the average value of a continuous function over a given interval.
8. Perform integration by the substitution (change of variable) technique.
9. Perform integration by the integration by parts technique.

Methods of Instruction/Course Format/Delivery:

Methods of Instruction/Course Format/Delivery: Methods employed will include Lecture/demonstration, 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

Assessment: 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.

Course Grade:

Assignment Weights	
Class Participation	10%
Homework/Quiz Average	15%
Exams	55%
Comprehensive Final Exam	20%

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: Finite Mathematics with Calculus and Applications. 9th Edition. Lial, Greenwell and Ritchey ISBN 9780321749086
- MyMathLab Access ISBN 9780321199911
- Canvas Access
- Scientific Calculator

Other:

- For current texts and materials, use the following link to access bookstore listings: http://www.panolacollegestore.com
- For testing services, use the following link: http://www.panola.edu/elearning/testing.html
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Administration Building or go to http://www.panola.edu/student-success/disability-support-services/ 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, *The Pathfinder:* http://www.panola.edu/student-success/documents/pathfinder.pdf