

**COLLIN COUNTY COMMUNITY COLLEGE
COURSE SYLLABUS**

COURSE NUMBER: Math 1325

COURSE TITLE: Calculus for Business and Economics I

CREDIT HOURS: 3 **LECTURE HOURS:** 3 **LAB HOURS:** 1 **CLN/REC HOURS:** 0

ASSESSMENTS:

Prior to enrolling in this course, the student must demonstrate eligibility to enroll in the following: MATH 1316, MATH 1325, MATH 1350, or MATH 2373.

PREREQUISITE: MATH 1314, MATH 1324, or MATH 1414

COREQUISITE: None

TEXTBOOK:

For onsite courses: Calculus with Applications, Lial / Greenwell / Ritchey, 9th edition, 2008
Pearson Education, Inc.

For online courses: e-mail your professor, rkhoury@cccCd.edu, for textbook information.

SUPPLIES: Graphing calculator required

COURSE DESCRIPTION:

Study of differential calculus and integral calculus, including exponential and logarithmic functions, average value of a function, and basic differential equations.

COURSE MEASURABLE LEARNING OUTCOMES:

Upon completion of this course the students should be able to do the following:

1. Be able to find the rate of change of a function, both over an interval and instantaneously.
2. Use the derivative to study rates of change and marginal changes in economic applications
3. Construct accurate graphs of functions using the concepts of calculus.
4. Find optimum values of functions and apply them to practical situations, including related rates.
5. Solve problems involving logarithmic or exponential growth and decay using ideas of calculus.
6. Find anti-derivatives, both as indefinite integrals and as solutions to simple differential equations.

7. Use the Fundamental Theorem of Calculus to evaluate definite integrals and solve their applications including average value.

COURSE REQUIREMENTS:

Attending lectures, completing assignments, completing required exams and labs, and knowledge of calculator use are all required.

COURSE FORMAT:

Lecture, lab and guided practice.

METHOD OF EVALUATION:

A minimum of four written exams, a lab component grade, and a comprehensive final exam. Homework and/or quizzes may be used in place of one exam or in addition to exams. The weight of each of these components of evaluation will be specified in the individual instructor's addendum to this syllabus. All out-of-class course credit, including take-home exams, home assignments, service-learning, etc. may not exceed 25% of the total course grade; thus, at least 75% of a student's grade must consist of exams given in the class or testing center, and no student may retake any of these exams.

ATTENDANCE POLICY:

Attendance is expected of all students. If a student is unable to attend, it is his/her responsibility to contact the instructor to obtain assignments. Please see the schedule of classes for the last day to withdraw.

RELIGIOUS HOLY DAYS:

In accordance with section 51.911 of the Texas Education Code, the college will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within a reasonable time. A copy of the state rules and procedures regarding holy days and the form for notification of absence from each class under this provision are available from the Admissions and Records Office.

COURSE REPEAT POLICY:

All students may repeat this course only once after receiving a grade, including W. For example students who have taken this course twice have to choose a different course to take after two trials.

ADA STATEMENT:

It is the policy of Collin County Community College to provide reasonable and appropriate accommodations for individuals with documented disabilities. This College will adhere to all

applicable Federal and State laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to contact the ACCESS Office (G-200) or 972.881.5898, (TDD 972.881.5950) in a timely manner if he/she desires to arrange for accommodations.

ACADEMIC ETHICS:

The college may initiate disciplinary proceedings against a student accused of scholastic dishonesty. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions related to applications for enrollment or the award of a degree, and/or the submission of material as one's own work that is not one's own. Scholastic dishonesty may involve one or more of the following acts: cheating, plagiarism, collusion, use of annotated texts or teacher's editions, and/or falsifying academic records.

Cheating is the willful giving or receiving of information in an unauthorized manner during an examination, illicitly obtaining examination questions in advance, using someone else's work for assignments as if it were one's own, copying computer or Internet files, or any other dishonest means of attempting to fulfill the requirements of a course.

Plagiarism is the use of an author's words or ideas as if they were one's own without giving credit to the source, including, but not limited to, failure to acknowledge a direct quotation.

Collusion is intentionally or unintentionally aiding or attempting to aid another in an act of academic dishonesty, including but not limited to, failing to secure academic work; providing a paper or project to another student; providing an inappropriate level of assistance; communicating answers to a classmate about an examination or any other course assignment; removing tests or answer sheets from a test site; and allowing a classmate to copy answers.

Contact the Dean of Students at 972.881.5771 for the student disciplinary process and procedures or consult the CCCCD Student Handbook, section 7-2.3.

SPECIFIC REQUIREMENTS/COURSE CONTENT:

The student will be responsible for knowing all definitions and statements of theorems for each section outlined in the following modules.

MODULE 1: LIMITS, CONTINUITY AND THE DERIVATIVE

The student will be able to:

1. Find limits by constructing a table of values.
2. Find limits by direct substitution and rules of limits.
3. Find limits by factoring and rationalization of the numerator or denominator.
4. Find one-sided limits.
5. Find limits by examining a given graph.
6. To evaluate limits as x approaches $+\infty$ or $-\infty$.

7. Use the definition of continuity to show a given function is continuous at an indicated point.
8. Find points of discontinuity of a given function.
9. Determine if a function has an infinite limit at a point of discontinuity.
10. Find and interpret average rate of change over an interval.
11. Find and interpret instantaneous rate of change at a value.
12. Estimate the slope of the tangent line to a curve.
13. Find the slope and equation of a secant line given two points.
14. Find the slope and equation of a tangent line to a curve.
15. Use the limit definition of the derivative to find the derivative of a polynomial, rational, or square root function.
16. Determine the existence of the derivative by examining a given graph.
17. Sketch the graph of the derivative of a function given its graph.

MODULE 2: MORE DERIVATIVES

The student will be able to:

1. Find the derivative of a function using the constant, power, sum, and difference rules.
2. Apply marginal analysis to cost, revenue, and profit functions.
3. Find the derivative of a function using the product rule or quotient rule.
4. Find the marginal average revenue, marginal average cost, and marginal average profit.
5. Find the derivative using the chain rule.
6. Find the derivative of exponential functions.
7. Find the derivative of logarithmic functions.

MODULE 3: GRAPHS AND CURVE SKETCHING

The student will be able to:

1. Find the critical numbers of a function.
2. Use a sign chart to find the intervals where a function is increasing or decreasing.
3. Use the first derivative test to find relative extrema.
4. Sketch the graph of a function using the information obtained from the first derivative.
5. Find the n^{th} derivative of a function.
6. Use a sign chart to find the point(s) of inflection of a graph.
7. Use a sign chart to find the intervals where a function is concave up or concave down.
8. Use the second derivative test to find relative extrema.
9. Use a sign chart to sketch curves by analyzing the first and second derivatives.
10. Analyze the definition of a function to locate horizontal, oblique, and vertical asymptotes, and hole(s) of the graph.

MODULE 4: ADDITIONAL DERIVATIVE TOPICS

The student will be able to:

1. Use the Extreme Value Theorem to find absolute extrema.

2. Solve optimization problems.
3. Solve Lot Size problems.
4. Solve Order Quantity problems.
5. Solve Elasticity of Demand problems.
6. Find derivatives by using implicit differentiation.
7. Find slopes of tangents by using implicit differentiation.
8. Solve related rate problems.
9. Use differentials to approximate increments.
10. Use L'Hôpital's Rule to find limits of functions.

MODULE 5: INTEGRATION

The student will be able to:

1. Given a function, find its antiderivative or integral using the basic integration formulas.
2. Find the indefinite integral of an exponential function.
3. Given initial conditions, find the constant of integration.
4. Given the marginal revenue function or marginal cost function, find the demand or total cost function.
5. Find the indefinite integral using substitution.
6. Use the sum of areas of rectangles to approximate area under a curve.
7. Evaluate definite integrals using the Fundamental Theorem of Calculus.
8. Find the average value of a function between $x = a$ and $x = b$.
9. Solve first order differential equations involving Growth and Decay by separation of variables.