

MATH1325.P01 SYLLABUS

Course Information

Course Number: MATH 1325

Course Title: Calculus for Business and Economics I

Course 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. Graphing calculator required. Lab required.

Course Credit Hours: 3
Lecture Hours: 3
Lab Hours: 1

Prerequisite: MATH 1314, or MATH 1324, or MATH 1414; or equivalent

Student Learning Outcomes:

- **State-mandated Outcomes:** Upon successful completion of this course, students will:
 1. Apply calculus to solve business, economics, and social sciences problems.
 2. Apply appropriate differentiation techniques to obtain derivatives of various functions, including logarithmic and exponential functions.
 3. Solve application problems involving implicit differentiation and related rates.
 4. Solve optimization problems with emphasis on business and social sciences applications.
 5. Determine appropriate technique(s) of integration.
 6. Integrate functions using the method of integration by parts or substitution, as appropriate.
 7. Solve business, economics, and social sciences applications problems using integration techniques.

- **Additional Collin Outcomes:**
 1. Calculate the rate of change of a function, both over an interval and instantaneously.
 2. Use the derivative to compute rates of change and analyze marginal changes in economic applications. (Communication Skills, Critical Thinking)
 3. Construct accurate graphs of functions using the concepts of calculus. (Empirical/Quantitative Skills, Communication Skills, Critical Thinking)
 4. Identify optimum values of functions and apply these values to practical situations, including related rates. (Empirical/Quantitative Skills, Communication Skills, Thinking)
 5. Solve problems involving logarithmic or exponential growth and decay using ideas calculus. (Empirical/Quantitative Skills, Communication Skills, Critical Thinking)

6. Find anti-derivatives, both as indefinite integrals and as solutions to simple differential equations. (Empirical/Quantitative Skills)
7. Use the Fundamental Theorem of Calculus to evaluate definite integrals and solve their applications including average value. (Empirical/Quantitative Skills, Communication Skills, Critical Thinking)

Withdrawal Policy: See the current *Collin Registration Guide* for last day to withdraw.

Collin College Academic Policies: See the current *Collin Student Handbook*.

Americans with Disabilities Act Statement: Collin College will adhere to all applicable federal, state and local 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, SCC-D140 or 972.881.5898 (V/TTD: 972.881.5950) to arrange for appropriate accommodations. See the current *Collin Student Handbook* for additional information.

INSTRUCTOR INFORMATION

Instructor's Name: Randy L. Collins, PhD

Office Number: PRC – J157

Office Hours: MWF 08:00 – 09:00 AM
TR 11:30 AM - 1:00 PM

Phone Number: 972-377-1034

In case of emergency, contact the Instruction Office at PRC (972)377-1554

Email: rlcollins@collin.edu

Always include your name and course number when writing e-mails. Please allow 24 hours for the instructor's response.

You must use your CougarMail when emailing your instructor. Emails from different accounts may not be answered.

Please check your CourgarMail daily.

Class Information:

Section Number: P01

Meeting Time: MWF 11:00 – 11:50

Meeting Location: LH 225

Important Dates to Understand:

Census Date (February 1, 2016) - If you drop before the census date, you **will not** receive a "W". The course will not appear on your transcript.

Last Withdrawal Date (March 18, 2016) - If you drop after the Census Date but before the **Last Withdrawal Date**, you **will** receive a "W".

After the **Last Withdrawal Date**, you **CANNOT** drop the class. You will receive the grade you earn in the class (A,B,C,D,or F).

Textbook & Supplies:

Textbook: Calculus with Applications, Lial / Greenwell / Ritchey, 10th edition, 2012 Pearson Education, Inc (Print textbook is recommended, e-book is included in MyMathLab purchase)

Online Access: MyMathLab access code for Textbook (required), **Calculator:** A graphing calculator is required (TI 83, TI 84, or TI 84 Plus C). Calculators with a computer algebra system (CAS) will not be permitted. Students should have calculator in class EVERY DAY.

Other: Pencil & paper should be brought to class each day. I would recommend that students purchase a 3-ring binder to organize notes and handouts throughout the semester.

Attendance Policy: Attendance is expected. Students are responsible for all material and assignments for a missed class. BE PRESENT on the class days that TEST/EXAMS are given. **There will be no Make-Up Tests unless the missed test is due to an extreme situation that is documented.** If a student is unable to attend, it is his/her responsibility to contact the professor to obtain assignments. You are expected to come to class prepared with your book, calculator, and completed homework assignments. If you arrive to class late, please be discreet. **Note: disruptive behavior, including repeated late arrive to class, can result in disciplinary action through the Dean of Students office.**

Course Requirements: Students are expected to attend class as scheduled and complete the required labs, homework, tests, final examination, and any other assignments required by the instructor. Participation in classroom discussions is strongly encouraged. Be engaged, ask questions and be courteous to your classmates. Be prepared for class each day by reading ahead the sections to be covered that day.

College Resources: All students are expected to study daily for this course. The material you learn in one class period will be used in the next. If you find that you need extra help:

- Come by my office during office hours with your questions and I will help you. If your schedule will not allow you to come during office hours, email me and we can schedule an appointment.

- Take advantage of the Math Lab. This is a free tutoring center for Collin math students. There are math labs on all three campuses.

Math Lab Locations:

Preston Ridge Campus	Math Lab F148	972-377-1639
Spring Creek Campus	Math Lab D203	972-881-5921
Central Park Campus	Math Lab C220	972-548-6896

- Fill out a tutor request form at the ACCESS office in F118 (PRC). All students are eligible for free group tutoring through ACCESS.
- Form a study group with classmates.

Method of Evaluation:

Tests are worth 55% of the final grade (4 per term).

Online Homework are worth 10% of the final grade

Labs are worth 10% of the final grade (5 labs per term).

In-class quizzes, activities, and participation are worth 10% of the final grade.

Final Exam is worth 15% of the final grade. A comprehensive final exam is REQUIRED for all students at the end of the course (NO EXCEPTIONS).

A = 89.5 - 100

B = 79.5 - 89.4

C = 69.5 - 79.4

D = 59.5 - 69.4

F = Below 59.

Grading Policies:

Tests: All tests are closed book, no notes. **Make-up tests will not be given unless the missed test is due to an extreme situation that is documented.** The grade on the final exam may be used to replace one (1) major test grade. All examinations will be given as outlined in the tentative calendar. **If you arrive late to the test and another student has already turned in their test you will not be given a test. A student must wait 24 hours from receiving test scores to discuss any issues the student has with his/her grade.** See the Testing Guidelines for information on how to complete tests.

Labs: There are 5 written lab quizzes required for this class. Each will be posted on Blackboard. Four of the labs are based on course content. **You are required to show your work on the lab sheet to receive full credit for these labs.** Late labs will not be taken. See the Lab Guidelines for information on how to complete the labs. The 5th lab will be due after your first test. It is a post-test analysis lab.

In-Class Quizzes: Periodic in-class quizzes are given during the semester. There are no make-up quizzes. All quizzes are closed book, no notes. Quizzes will normally be administered at the beginning of class, so arriving late will affect your ability to take the quiz and/or finish. Quizzes may or may not be announced ahead of time.

Homework: Homework is very important and is absolutely necessary for the successful completion of this course. Homework is automatically assigned after the corresponding section is covered in class. The student is expected to complete the work before the next class. **All homework is to be done using MyMathLab.** Students can rework all homework problems multiple times to receive a better homework grade. **All home must be completed by 11:59 pm on the day they are due.** You will not be turning in the handwritten work.

Testing Guidelines: The expectation for Tests are as follows:

- You must place all bags/notebooks/etc along the wall in the front of the room. This includes the cover to your calculator.
- You must turn off your cell phone and put it away. **If you are seen with your cell phone out your test will be collected and you will not be able to finish it at another time.**
- You cannot leave the room until you have turned in your test. Go to the restroom before the exam.
- All hats must be worn backwards.
- No drinks/food allowed on your desk.
- If you arrive to take the test after a classmate has turned in their test you will not be allowed to take your test. Arrive to class on time.
- Any talking during the test is not allowed.

Lab Guidelines: The expectation for Lab Quizzes are as follows:

The instructor reserves the right not to accept or deduct points (up to 10 points) from assignments that do not follow these guidelines.

1. Write **first and last name** and **section number on the front of the lab sheet.**
2. Use **pencil** on all papers.
3. All work must be completed on the lab sheet. Notebook paper will not be taken.
4. **Circle** answers for clarity, **Show all your Work** and that work must support the answer. An **illegible answer** is a **wrong** answer.
5. If making graphs you must use graph paper.
6. All sheets must be stapled together.

Student Responsibilities:

- Participation in class discussions is strongly encouraged. Be engaged and ask questions to ensure understanding of the material.
- Be courteous to your fellow classmates.
- Attend class and be aware of announcements made in class or via email.
- Inform instructor of late arrival at the conclusion of class and be sure it is noted.
- Understand the syllabus, especially attendance, grading, test, and cell phone policies.
- Take care of personal needs before or after class.

Technology Use in the Classroom:

The use of a cell phone, Bluetooth, and/or laptop is **PROHIBITED** during class. Cell phones must be turned off or put on silent (not vibrate) during class. If your cell phone continually rings during class, it will be considered disruptive behavior resulting in disciplinary action through the Dean of Students office. Other electronic devices are prohibited without prior approval of the instructor.

College Repeat Policy: It is very important that student realized that this course can be repeated **ONLY ONCE**. This includes a grade of “W”. **Section 51.907 of the Texas Education Code: A student is limited to SIX withdrawals (W’s) for their entire college career.** This includes any course a transfer student has withdrawn from at another Texas institute of higher education.

The instructor reserves the right to make changes to this syllabus during the semester. Changes will be provided in writing during class hours and/or posted on blackboard.

**Math 1325 Tentative Course
Calendar**

Week	Sections to Cover
1 1/19-1/22	<ul style="list-style-type: none"> • Introduction • PASS Exam • 3.1 Limits
2 1/25-1/29	<ul style="list-style-type: none"> • 3.2 Continuity • 3.3 Rates of Change
3 2/01-2/05	<ul style="list-style-type: none"> • 3.4 Definition of the Derivative • 3.5 Graphical Differentiation
4 2/08-2/12	<ul style="list-style-type: none"> • 4.1 Techniques for Finding Derivatives • 4.2 Derivatives of Products and Quotients
5 2/15-2/19	<ul style="list-style-type: none"> • Exam 1 - Monday 2/15 • Lab 1 Due - Wednesday 2/17 • 4.3 The Chain Rule • 4.4 Derivatives of Exponential Functions
6 2/22-2/26	<ul style="list-style-type: none"> • 4.5 Derivatives of Logarithmic Functions • 5.1 Increasing and Decreasing Functions
7 2/29-3/04	<ul style="list-style-type: none"> • 5.2 Relative Extrema • 5.3 Higher Derivatives, Concavity, and the Second Derivative Test
3/07 - 3/11	<i>Spring Break March 7 - 11</i>

8 3/14-3/18	<ul style="list-style-type: none"> • 5.4 Curve Sketching • Exam 2 – Friday 3/18
9 3/21-3/23	<ul style="list-style-type: none"> • Lab 2 Due – Monday 3/21 • 6.1 Absolute Extrema • 6.2 Applications of Extrema • 6.3 Further Business Applications
10 3/28-4/01	<ul style="list-style-type: none"> • 6.4 Implicit Differentiation • 6.5 Related Rates • 6.6 Differentials: Linear Approximation
11 4/04-4/08	<ul style="list-style-type: none"> • 12.7 L'Hospital's Rule • Exam 3 – Friday 4/08
12 4/11-4/15	<ul style="list-style-type: none"> • Lab 3 Due – Monday 4/11 • 7.1 Antiderivatives • 7.2 Substitution
13 4/18-4/22	<ul style="list-style-type: none"> • 7.3 Area and the Definite Integral • 7.4 The Fundamental Theorem of Calculus
14 4/25 -4/29	<ul style="list-style-type: none"> • 8.2 Volume and Average Value (Average Value Only) • 10.1 Solutions of Elementary and Separable Differential Equations
15 5/02-5/06	<ul style="list-style-type: none"> • Test Review • Exam 4 – Wednesday 5/04 • Lab 4 Due – Friday 5/06 • Final Exam Review
5/11	<ul style="list-style-type: none"> • Final Exam <ul style="list-style-type: none"> ○ Wednesday 05/11 11:00AM – 1:00PM

Any changes in the course calendar will be announced in class and/or posted on blackboard. Check blackboard regularly for important announcements and information.

Math 1325 Course Objective

COURSE CONTENT: Proofs and derivations will be assigned at the discretion of the instructor.

The student will be responsible for knowing all definition 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 ∞ .
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.