I. COURSE INFORMATION

Instructor: Jeff Lyons
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Office Phone: (361) 825-3265
Office Hours: TBA
Email: Jeff.Lyons@tamucc.edu
Website: sci.tamucc.edu/~jlyons
Time & Location: MW F 11:00-11:50 AM in CS 112
Final Exam: Monday, December 12 from 11:00-1:30 PM in CS 112

II. COURSE DESCRIPTION

The main concepts covered in this class are limits of functions, continuity of a function, the derivative of a function, and an introduction to the integral of a function.

III. COURSE PREREQUISITES

College Algebra (Math 1314) and Trigonometry (Math 1316), or Pre-calculus (Math 2312), or placement beyond Math 2312.

IV. COURSE MATERIALS

Required: Unused access code for online WebAssign and a Texas Instruments TI-83 plus (or higher) graphing calculator.

V. COURSE OBJECTIVES AND GOALS

At the end of the course the student should:

1. Understand and use the concept of the limit of a function.
   a. Use properties of limits and other techniques, like L’Hopital’s rule, to determine the existence or not of the limit of a function at a given value;
   b. Understand the definition of continuity of functions
      i. From a function given a graph determine the discontinuity point indicating which properties of continuity fail, and
      ii. From a given piece-wise function defined by formulas determine the points at which the function is discontinuous.

2. Be able to provide examples and counterexamples dealing with important results discussed in this course, and especially to understand the necessity of the conditions for some of them:
   a. Give an example of a function which does not satisfy the Intermediate Value Theorem (IVT),
   b. Give an example of a function which does not satisfy the Mean Value Theorem (MVT),
   c. Give an example of a discontinuous function with a removable/non-removable discontinuity,
   d. Give an example of a function whose limit does not exist at a point,
   e. Give an example of a function that is continuous but not differentiable at a point.

3. Understand and interpret the concept of the derivative:
   a. Graphically, as the slope of the tangent line at a point,
   b. Analytically, as the instantaneous rate of change of the function,
   c. Use information about the first and second derivative to obtain information about the original function, interpret the units of the derivative,
   d. Points where the function is increasing the fastest, where it is constant, etc.,
e. From a given graph determine all the critical points and indicate at which the function is not differentiable.

f. From a function defined piecewise determine whether or not the function is differentiable at the point(s) where the pieces join.

4. Find the linear approximation of a function at a differentiable point and use it to estimate the function.
   a. Produce the linear approximation from a graph and determine if in a neighborhood of the point it will give an overestimate or underestimate.
   b. From a function defined by an algebraic expression find the linear approximation at a given point and use it to estimate the original function and justify whether it is an overestimate or underestimate.

5. Sketch the graph of a function or its derivative function:
   a. From the graph of a function, produce the graphs of the first and second derivative functions.
   b. From the graph or information about the first and second derivative of a function, generate the graph of the function.
   c. From a function defined by a formula find the information to sketch its graph (domain, continuity points, increasing/decreasing intervals, concave up/down, end behavior, asymptotes).

6. Use calculus techniques to find the solution of problems:
   a. Given an optimization problem find the mathematical model for it, and solve it using calculus techniques.
   b. Related rates problems.

7. Use implicit differentiation:
   a. Calculate derivatives using implicit differentiation.
   b. Determine the equation of tangent lines to graphs obtained from expressions where one variable is given implicitly as the function of the other.

8. Understand the concept of the integral:
   a. Interpret the units of the integral in the solution of problems.
   b. Evaluate basic definite integrals.
   c. Calculate the area of regions by using integration.
   d. Interpret integrals as area to evaluate them.
   e. Estimate integrals using Riemann Sums.
   f. Use the Fundamental Theorem of Calculus to understand the relationship between integration and differentiation.

VI. INSTRUCTIONAL METHODS AND ACTIVITIES

Methods and activities for instruction include: Lectures, calculator demonstrations and group activities. Students will complete practice materials online and do and submit homework online. Help will be available from the instructor during office hours and through email. Tutoring is also available on campus.

VII. EVALUATION AND GRADE ASSIGNMENT

The methods of evaluation and the criteria for grade assignments are:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>15%</td>
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<tr>
<td>Quizzes</td>
<td>10%</td>
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<tr>
<td>Labs</td>
<td>20%</td>
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<tr>
<td>Derivative Mastery</td>
<td>10%</td>
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<tr>
<td>Exams</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>15%</td>
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Grading Scale – grades will be no stricter than:

- A = 90 – 100
- B = 80 – 89.99
- C = 70 – 70.99
- D = 60 – 69.99
- F = 59.99 or below

No special options, assignments, or alternative grading schemes will be considered for individual students. All graded materials returned to the student are the sole responsibility of the student and must be resubmitted to the professor to receive consideration in grading disputes. The sharing of calculators and other materials during quizzes and exams is not permitted.
**Homework:** Individual assignments are made online through WebAssign. Students will solve and submit completed homework assignments online through WebAssign. Homework will be assigned at the completion of each section and each homework assignment will have a due date. WebAssign will not allow students to submit homework assignments after the due date has passed. WebAssign can be temporarily unavailable or behave erratically from time to time – **no time extensions will be given for these problems.** Therefore, it is in your best interest to finish the assignment well before the due date. Time extensions for homework **will not** be given for any other circumstances, happenings, or individual student situations, period. It is also advisable to work extra problems out of the textbook’s exercise section for more practice, and it is the discretion of the professor to assign extra homework at any time. Homework is worth 15% of the course grade.

**Quizzes:** Quizzes will be assigned online and also in class. Calculators will be allowed unless otherwise instructed. The top 10 quiz grades will count. Quizzes are worth 10% of the course grade.

**Labs:** Students will work through each of 10 sets of ‘lab’ materials during the assigned lab times. The reports will be graded on correctness, conclusions and presentation. The Lab TA will communicate your grade. The lab grade is 20% of the course grade. Labs can be found here: http://math.tamucc.edu/MATHlabs/MATHlabs

**Derivative Mastery:** Students are expected to master the skill of finding derivatives of standard functions by scoring at least 70% on one of three attempts at a test. All of the 10 percentage points are awarded for mastery, none otherwise, i.e. you receive a 100 or a 0 for this portion of the course grade. There will be a list of objectives and practice tests posted. Here is a link for more information: http://sci.tamucc.edu/~math/math/uploads/MATH/gateway.pdf.

**Exams:** There will be three equally weighted individual assessment exams given during the course of the semester. Calculators will be allowed unless otherwise instructed. Exam dates will be announced at least one week in advance, but a tentative exam scheduled is given below. The combined exams will be worth 30% of the course grade.

**Final Exam:** The final exam will be an individual assessment covering **ALL** material presented in the course. Graphing calculators are allowed and even encouraged for the final exam. The final is worth 15% of the course grade. If your final exam grade is higher than your lowest exam grade, the final exam grade will replace your lowest exam grade.

**VIII. TENTATIVE COURSE SCHEDULE**

<table>
<thead>
<tr>
<th>Day</th>
<th>Topic(s)</th>
<th>Day</th>
<th>Topic(s)</th>
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<tbody>
<tr>
<td>8/24</td>
<td>Intro &amp; Review</td>
<td>10/14</td>
<td>3.9: Related Rates</td>
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<tr>
<td>8/26</td>
<td>Review</td>
<td>10/17</td>
<td>3.10: Linear Approximation and</td>
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<td>Differentials</td>
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<tr>
<td>8/29</td>
<td>Exploration of Limits</td>
<td>10/19</td>
<td>Chapter 3 Review</td>
</tr>
<tr>
<td>8/31</td>
<td>2.1: The Tangent and Velocity Problems</td>
<td>10/21</td>
<td>Chapter 3 Test</td>
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<tr>
<td>9/2</td>
<td>2.2: The Limit of a Function</td>
<td>10/24</td>
<td>4.1: Maximum and Minimum Values</td>
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<tr>
<td>9/7</td>
<td>2.3: Calculating Limits Using the Limit Laws</td>
<td>10/26</td>
<td>4.2: The Mean Value Theorem</td>
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<tr>
<td>9/9</td>
<td>2.5: Continuity</td>
<td>10/28</td>
<td>4.3: How Derivatives Affect the</td>
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<td></td>
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<td>Shape of a Graph</td>
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<tr>
<td>9/12</td>
<td>2.5: Continuity</td>
<td>10/31</td>
<td>4.3: How Derivatives Affect the</td>
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<td>2.6: Limits at Infinity; Horizontal Asymptotes</td>
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<td>Shape of a Graph</td>
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<tr>
<td>9/14</td>
<td>Exploration of Derivatives</td>
<td>11/2</td>
<td>4.4: Indeterminate Forms and</td>
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<td>L’Hospital’s Rule</td>
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<tr>
<td>9/16</td>
<td>2.7: Derivatives and Rates of Change</td>
<td>11/4</td>
<td>4.5: Summary of Curve Sketching</td>
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<tr>
<td>9/19</td>
<td>2.8: The Derivative as a Function</td>
<td>11/7</td>
<td>4.6: Graphing with Calculus and</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Calculators</td>
</tr>
<tr>
<td>9/21</td>
<td>Chapter 2 Review</td>
<td>11/9</td>
<td>4.7: Optimization Problems</td>
</tr>
<tr>
<td>9/23</td>
<td>Chapter 2 Test</td>
<td>11/11</td>
<td>4.7: Optimization Problems</td>
</tr>
<tr>
<td>9/26</td>
<td>3.1: Derivatives of Polynomials and Exponential Functions</td>
<td>11/14</td>
<td>4.8: Antiderivatives</td>
</tr>
<tr>
<td>9/28</td>
<td>3.2: The Product and Quotient Rules</td>
<td>11/16</td>
<td>Chapter 4 Review</td>
</tr>
<tr>
<td>9/30</td>
<td>3.3: Derivatives of Trigonometric Functions</td>
<td>11/18</td>
<td>Chapter 4 Test</td>
</tr>
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IX. CLASS POLICIES AND EXPECTATIONS

Attendance: Attendance is mandatory. Absences in the class may impact your final grade. Please save absences for emergencies. Any adjustments or corrections to the schedule or other policies will be announced in class and it is the responsibility of the student to stay informed of such changes. It is wise to develop acquaintances you can depend upon in case of an absence.

Make-ups: Since attendance is expected, there will be no make-up of online homework due to absence – excused or unexcused – no exceptions. There will be no make-ups given for missed quizzes or exams. If the student has a legitimate conflict, for example, an athletic event, it will be possible to schedule to take a quiz/exam in advance of the quiz/exam date. This should be handled as soon as possible to allow the professor adequate time to prepare an alternate quiz/exam. Students absent from the final exam must either qualify for an incomplete [for the course] or receive a grade of zero for the exam; the final exam cannot be rescheduled or made-up.

Email: I will send information, updates, etc. through email to your islander (or campus registered) email account. It is your responsibility to check the account often for important and pertinent information. I will also reply to email as best I can. Remember I have multiple classes so a response may be slow at times.

Website: The course website is www.sci.tamucc.edu/~jlyons. There will be information about tests and quizzes, documents, etc. posted on the website. You will want to check frequently for updates. Please review the website before contacting me about quizzes, exams, etc.

Late arrivals and early departures not only disturb your professor but your fellow students. Please refrain from moving about and talking during class. If you disrupt the class for any reason, I may require you to leave the classroom.

Students will not be allowed to use cell phones or MP3 devices during class. If a student is caught using either during a quiz or exam, it will be considered as cheating and may warrant an “F” for the assignment.

Read lessons before and after each class. Take detailed notes from the book and class lectures.

Ask questions in class. Feel free to interrupt the lecture or discussion at any time for relevant questions. They are very much encouraged and will benefit everyone in the class. Come into my office during office hours for as much help as you need. You can also schedule a time in advance with me outside office hours for extra help if needed. Please email me with any questions you might have, and I will do my best to respond quickly.

X. DROPPING A CLASS

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. April 1st is the last day to drop a class with an automatic grade of “W” this term.
XI. ACADEMIC INTEGRITY/PLAGIARISM

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will rest in an F on the assignment or test.

XII. CLASSROOM/PROFESSIONAL BEHAVIOR

Texas A&M University – Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in Article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. The prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

XIII. DISABILITY SERVICES

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 reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Disability Services Office at (361) 825-5816 or go to the office at Driftwood 101.

XIV. GRADE APPEALS PROCESS

As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

XV. CHANGES

The instructor may amend the syllabus at any time prior to the final exam by announcing the changes in class.