I. COURSE INFORMATION
1. Meeting Time & Place: TR 9:30 – 10:45 AM in CI 122
2. Professor: Dr. D. Palaniappan (Dr. Pal)
3. Office Phone: 825-2221
4. Office: ST 211
5. e-mail Address: devanayagam.palaniappan@tamucc.edu
7. Office Hours:
   MW 3:00 – 4:30 PM
   TR 12:30 – 1:30 PM
   and by appointment
8. Class Hours: You also need to register for a section of the lab. Lecture and lab together count as a four-hour course.

II. COURSE DESCRIPTION
In this course we will deal with derivatives and integrals of functions in one variable. The course begins with limits, and uses them to define the derivative of a function. Then differentiation rules are discussed, followed by applications of differentiation. Finally, integrals are introduced followed by some applications of integrals.

III. PREREQUISITES FOR THE COURSE
MATH 1314 (College Algebra) and MATH 1316 (Trigonometry), or MATH 2312 (Precalculus), or placement beyond MATH 2312.

IV. TEXT and OTHER SUPPLIES REQUIRED
The required textbook for the course is Calculus Early Transcendentals (7E), by James Stewart. A graphing calculator is permitted for certain assignments in this course. I will support the TI-89, but in general you can use any graphing calculator. All the necessary class demonstrations will be done with a TI-89. You may also get acquainted with MyMathLab, found at http://coursecompass.com/ and/or with MyLabsPlus, found at http://www.tamucc.mylabsplus.com

V. STUDENT LEARNING OUTCOMES
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'Hôpital'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 in a graph determine the discontinuity point indicating which properties of continuity fail;
ii. Given a 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 courses, and specially 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 dif-
      ferentiable 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. They will 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 the student will find the linear
      approximation at a given point and use it to estimate the original function. The
      student has to justify whether it is an overestimate or under estimate.

5. Sketch the graph of a function or its derivative function:
   a. From the graph of a function, they 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
      they will generate the graph of the function.
   c. From a function defined by a formula they will find the information to sketch its
      graph (domain, continuity points, increasing/decreasing, concave up/down, end
      behavior, asymptotes)

6. Use calculus techniques to the solution of problems:
   a. Optimization problems. Given an optimization problem the student will find the
      mathematical model for it, and will proceed to solve it using calculus techniques
      (for some they may need to use technology)
   b. Related rates problems.

7. Use implicit differentiation properly:
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 a function of 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 so that the student understands the relationship between integration and differentiation.

VI. INSTRUCTIONAL METHODS AND ACTIVITIES
Methods and activities for instruction include: Lectures, calculator demonstrations and group activities.

VII. EVALUATION AND GRADE ASSIGNMENT
The methods of evaluation and the criteria for grade assignments are:
The lab part of the course is graded by the TA and counts for 20% of the course grade. A gateway test on derivatives will be given in the lab (see the lab syllabus) to guarantee you get the computational part down. You have three attempts to pass the gateway test, the best attempt counts. To pass the gateway test you need to have at least 70% of the problems correct, otherwise your score is zero. The gateway test counts for 10% of your grade. There is no partial credit on the gateway test. You may only bring a pencil and an eraser to the test. Use of a calculator, computer or cell-phone or notes during any of the three attempts at the gateway exam results in a grade of zero for the overall gateway grade and will be reported to the appropriate authorities for further sanctions.

Calculator policies and partial credit: For the hour-exams and the final exam calculators are permitted. These exams do have partial credit. The gateway test is a no-calculator exam with no partial credit.

The weights of the different parts of the course towards the final grade are:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Three exams</td>
<td>40%</td>
</tr>
<tr>
<td>Homework and Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Labs</td>
<td>20%</td>
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<tr>
<td>Gateway Test</td>
<td>10%</td>
</tr>
<tr>
<td>Comprehensive Final Exam</td>
<td>20%</td>
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</tbody>
</table>

Homework will be assigned in class along with the due date. Late homework received no credit. Quizzes will be given in class. At the end of the semester the lowest two homework/quiz grades get dropped. No exam grades get dropped.

Grading Scale: Grades will be no stricter than
A = 90.00 – 100%
B = 80.00 – 89.99%
C = 70.00 – 79.99%
VIII. TENTATIVE COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Class</th>
<th>Date</th>
<th>Sections</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R 8/23</td>
<td></td>
<td>Handouts of syllabus and Review of Prerequisites</td>
</tr>
<tr>
<td>2</td>
<td>T 8/28</td>
<td>1.1–1.6</td>
<td>Review of Prerequisites</td>
</tr>
<tr>
<td>3</td>
<td>R 8/30</td>
<td>2.1</td>
<td>The Tangent and Velocity Problems</td>
</tr>
<tr>
<td>4</td>
<td>T 9/04</td>
<td>2.2</td>
<td>The Limit of a Function</td>
</tr>
<tr>
<td>5</td>
<td>R 9/06</td>
<td>2.3</td>
<td>Calculating Limit using Limit Laws</td>
</tr>
<tr>
<td>6</td>
<td>T 9/11</td>
<td>2.5</td>
<td>Continuity</td>
</tr>
<tr>
<td>7</td>
<td>R 9/13</td>
<td>2.6</td>
<td>Limits at Infinity, Horizontal Asymptotes</td>
</tr>
<tr>
<td>8</td>
<td>T 9/18</td>
<td>2.7, 2.8</td>
<td>Derivatives and Rates of Change, The Derivative as a Function</td>
</tr>
<tr>
<td>9</td>
<td>R 9/20</td>
<td>3.1, 3.2</td>
<td>Derivatives of Polynomials, Exponentials, The Product and Quotient Rules</td>
</tr>
<tr>
<td>10</td>
<td>T 9/25</td>
<td>3.3, 3.4</td>
<td>Derivatives of Trigonometric Functions, The Chain rule</td>
</tr>
<tr>
<td>11</td>
<td>R 9/27</td>
<td></td>
<td>Exam # 1 covering chapter 2</td>
</tr>
<tr>
<td>12</td>
<td>T 10/02</td>
<td>3.5, 3.6</td>
<td>Implicit Differentiation, Logarithmic Differentiation</td>
</tr>
<tr>
<td>13</td>
<td>R 10/04</td>
<td>3.7, 3.8</td>
<td>Rates of Change, Exponential Growth and Decay, Derivatives of Inverse Trigonometric Functions</td>
</tr>
<tr>
<td>14</td>
<td>T 10/09</td>
<td>3.9</td>
<td>Related Rates</td>
</tr>
<tr>
<td>15</td>
<td>R 10/11</td>
<td>3.10, 3.11</td>
<td>Linear Approximation and Differentials, Hyperbolic Functions</td>
</tr>
<tr>
<td>16</td>
<td>T 10/16</td>
<td>4.1</td>
<td>Maximum and Minimum values</td>
</tr>
<tr>
<td>17</td>
<td>R 10/18</td>
<td>4.2</td>
<td>The Mean Value Theorem</td>
</tr>
<tr>
<td>18</td>
<td>R 10/23</td>
<td>4.3</td>
<td>How Derivatives affect the Shape of a Graph</td>
</tr>
<tr>
<td>19</td>
<td>T 10/25</td>
<td></td>
<td>Exam # 2 covering chapter 3</td>
</tr>
<tr>
<td>20</td>
<td>T 10/30</td>
<td>4.4</td>
<td>Indeterminate Forms and L’Hôpital’s Rule</td>
</tr>
<tr>
<td>21</td>
<td>R 11/01</td>
<td>4.5, 4.6</td>
<td>Summary of Curve Sketching, Graphing with Calculus and Calculators</td>
</tr>
<tr>
<td>22</td>
<td>T 11/06</td>
<td>4.7</td>
<td>Optimization Problems</td>
</tr>
<tr>
<td>23</td>
<td>R 11/08</td>
<td>4.9</td>
<td>Antiderivatives</td>
</tr>
<tr>
<td>24</td>
<td>T 11/13</td>
<td>5.1, 5.2</td>
<td>Areas and Distances, The definite integral</td>
</tr>
<tr>
<td>25</td>
<td>R 11/15</td>
<td>5.3</td>
<td>The Fundamental Theorem of Calculus</td>
</tr>
<tr>
<td>26</td>
<td>T 11/20</td>
<td>5.4</td>
<td>Indefinite Integrals and the net Change Theorem</td>
</tr>
<tr>
<td>27</td>
<td>T 11/27</td>
<td></td>
<td>Review</td>
</tr>
<tr>
<td>28</td>
<td>R 11/29</td>
<td></td>
<td>Exam # 3 covering chapter 4</td>
</tr>
<tr>
<td>29</td>
<td>T 12/04</td>
<td></td>
<td>Review</td>
</tr>
</tbody>
</table>
The comprehensive Final Exam (including chapter 5) is on Tuesday, December 11, 8:00 – 10:30 AM in the usual classroom.

IX. **CLASS POLICIES**

Attendance will be taken each class. For most students attending class is a faster way of learning the material than trying to catch up on missed material solely from the book.

Tardiness is often disruptive to the whole class and is not appreciated. If you are delayed and arrive late for class please do so quietly.

Cell phones and such must be turned off before class. Each time your phone rings during class, your course grade goes down by 1%.

If you have to miss an exam, it is your responsibility to contact me **no later than the day of the exam**. One make-up exam will be scheduled for each exam. Make-up exams tend to be harder than the original exam. Failure to contact me on or before the exam day results in a grade of zero points for the exam. Only extreme emergencies or official university business are acceptable reasons to miss exams and documentation will be required. If your reason to miss the exam is not a valid one, your exam score is 0 points. Be sure to check before missing an exam whether your reason is acceptable.

You are expected to conduct yourself in accordance with the highest standards of academic honesty. Copying homework from another student or have the tutors do it your you or copying homework from the solutions manual is considered academic dishonesty - don’t do it! In turning in work for a grade you attest that the work is your own work. The policies about academic dishonesty outlined in the Undergraduate Catalog or Student Handbook apply: academic dishonesty results in zero points on the test or assignment and the incident will be reported to the appropriate authorities, which may impose further sanctions.

Additions or changes to this syllabus will be announced in class.

X. **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](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.

XI. **DISABILITY STATEMENT**

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 for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Disabilities Service Office at (361) 825-5816 or visit the office in Driftwood 101. The Disabilities Service Office will determine appropriate accommodations and outline them in a notification letter. You will then be asked to give this letter to your instructors. Without an accommodation plan, no student can be treated differently from the others.